CPI Stake in U. S. Satellite

page 30

Chemical Week

February 8, 1958

Price 35 cents

Now look at propylene: debut in plastics brings re-evaluation of its chemical potential . . . p. 28

Mockup speeds startup. Training with simulated control panel puts plant on line 20% faster . . p. 63

TVA fertilizer program draws new fire from ag chemical makers. At issue: pricing, distribution . p. 75

Offbeat chemical reactors speed high-pressure, high-temperature research . . . . . p. 83

Growing public hostility to mass spray programs may stunt market for insecticides . . . . . p. 96

E P POWER
UNIVERSITY MICROFILMS
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FROM
MATHIESON

Dimethyl Ether of Diethylene Glycol

(Poly-Solv D2M)

Anhydrous Reaction Medium for...

Alkylation of Amines with Sodium Hydride
Self-Condensation of Esters with Sodium Hydride
Mixed Ester Condensations with Sodium Hydride
Reductions Employing Sodium Borohydride.

Unique Solvent for Organics and Inorganics

Completely Water Miscible
High Boiling

There's a new source of high purity dimethyl ether of diethylene glycol (Poly-Solv D2M) at Olin Mathieson's modern organic chemicals plant in Brandenburg, Kentucky. Write today for technical information. Poly-Solv D2M is shipped in 55-gal. drums.

Ethylene Oxide, Ethylene Glycol, Ethylene Diamine, Diethylene Glycol, Triethylene Glycol, Polyethylene Glycols (Poly-G's), Polyamines, Ethanolamines, Dichloroethylether, Ethylene Dichloride, Surfactants (Poly-Tergents), Glycol Ether Solvents (Poly-Solv's)

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OLIN MATHIESON CHEMICAL CORPORATION
MATHIESON

ORGANIC CHEMICALS DIVISION

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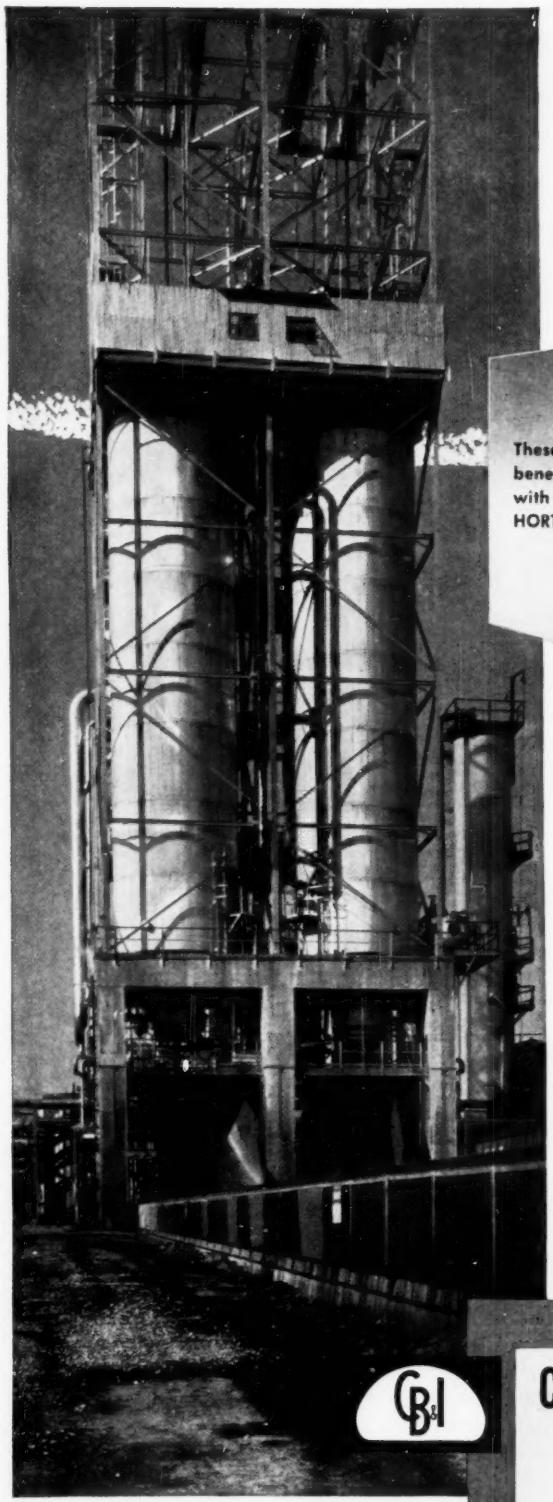

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(manufactured by vacuum bonding process)

provides better corrosion protection in clad vessels

These benefits with HORTONCLAD® . . .
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• HIGH STRENGTH BOND
• CLEAN, CONTAMINANT–FREE SURFACE
• ADAPTABILITY TO ANY SIZE OR SHAPE

Hortonclad, available only in CB&I tanks, pressure vessels and other clad structures, is unlike other clad materials. The bond is accomplished by a flux-free high strength vacuum bonding process producing a clad plate with an integral and continuous bond of exceptionally high strength. Uniform clad thickness results as both alloy cladding and backing are in their final thickness *before* bonding. Silver, stainless steels (both chromium and chromium nickel) nickel and high nickel alloys such as Monel, Inconel, and Hastelloys B and F can be employed in the Hortonclad process.

In corrosive service, Hortonclad permits the use of higher temperatures, concentration and pressures—without the high cost of solid alloy vessels. For further information on its application write our nearest office . . . ask for the *Hortonclad* bulletin.

405 STAINLESS STEEL HORTONCLAD was used in the fabrication of these two 16-ft. diam. by 65-ft. high coking chambers by CB&I.

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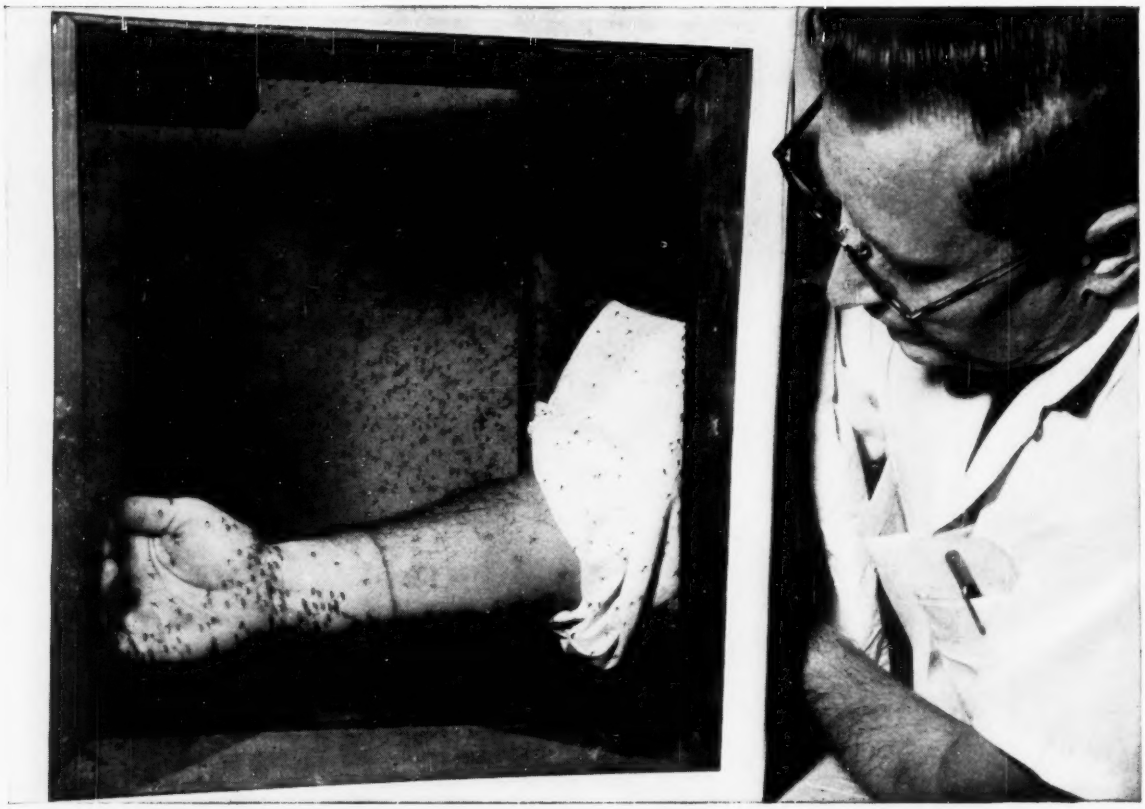
P52



CONVINCING EVIDENCE—A swarm of mosquitoes in this test glass enclosure show no interest in the man's arm above the black line where meta Delphene repellent has been applied, although they feast on his untreated wrist and hand. (USDA Photo)

INSISTENCE ON QUALITY RESULTS IN CONSUMER APPROVAL OF meta DELPHENE

Production of meta Delphene, Hercules Powder Company's diethyl toluamide, presented a challenging problem in the isolation of the product in the purity required of a cosmetic chemical. In solving this problem, Hercules drew on its long background in xylene oxidation to produce a material of uniformly high meta isomer content, free from color, odor, or irritating contaminants.

Consumer sales last summer of repellents based on meta Delphene reached the millions. Enthusiastic reports from both formulators and users proved that meta Delphene offered amazingly long protection from insect pests, even under extreme conditions of wiping and perspiration. The public also welcomed the excellent cosmetic properties of the new material. Users were particularly pleased to find that meta Delphene was not oily, as they had long associated "oiliness" with older repellents.

Hercules' recent expansion of its plant facilities at Brunswick, Georgia, will assure you of an adequate supply of the same high quality meta Delphene for the 1958 season.

meta DELPHENE
HERCULES TRADEMARK

Agricultural Chemicals Division, Naval Stores Department
HERCULES POWDER COMPANY
INCORPORATED
900 Market Street, Wilmington 99, Delaware

N057-2(R)

Chemical Week

TOP OF THE WEEK

February 8, 1958

International Minerals assembles new team for study of mineral ore processing, products ..... **p. 40**

Here's how Hercules rebuilt cotton growers' confidence in chlorinated insecticides ..... **p. 47**

Heating problem in your plant? Gas-burning infrared generator may provide the solution ..... **p. 66**

13 OPINION

15 MEETINGS

17 BUSINESS NEWSLETTER

28 Burgeoning chemical role may be ahead for propylene, as veteran plastics makers map plans to follow Hercules into polypropylene production.

30 Still another missile-fuel merger; Thiokol-Reaction Motors combination doesn't mean smaller role for Thiokol's chemical business. New entry in petrochemicals: Kansas-based Vickers Petroleum puts $2.5 million into aromatics project.

31 Rotproof jackets for wooden beams and pilings? Inventor predicts big new application for reinforced plastics.

32 U.S. chemical producers win Treasury's approval on higher valuation basis for numerous imports.

37 WASHINGTON NEWSLETTER

40 ENGINEERING
IMC's mineralogical lab aids top management planners by getting the facts for new and improved products and processes.

47 ADMINISTRATION
An ambitious public relations program helps Hercules turn the tide of unfavorable comment on its toxaphene boll weevil spray.

50 Settlement of the pulp- and paperworkers' strike in British Columbia will be a key factor in setting Canadian chemical wages.

52 A new tool to measure air pollution uses only statistics, is potential aid to management in pinpointing problems, choosing sites.

63 PRODUCTION
Carmody Corp. builds training devices, teaches chemical plant operators how to run process equipment before plant is built.

66 German-developed gas infrared generator gives new boost to industrial use of infrared heating.

71 TECHNOLOGY NEWSLETTER

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TVA-private fertilizer industry controversy flares again.

78 Interlocking steel drums introduced for chemical products.

83 RESEARCH
Big petroleum companies try new unusual reactors in effort to develop new fuels, additives.

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96 MARKETS
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101 SPECIALTIES
Soapmakers at 31st convention show why they're optimistic about their chances throughout next decade.

104 Samrand, Inc., builds a specialty resin business by cashing in on a mistake.

110 CHARTING BUSINESS

PHOTO P. 28, ARNOLD EAGLE, STANDARD OIL COMPANY OF NEW JERSEY; P. 83, THE TEXAS CO.

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No. 6

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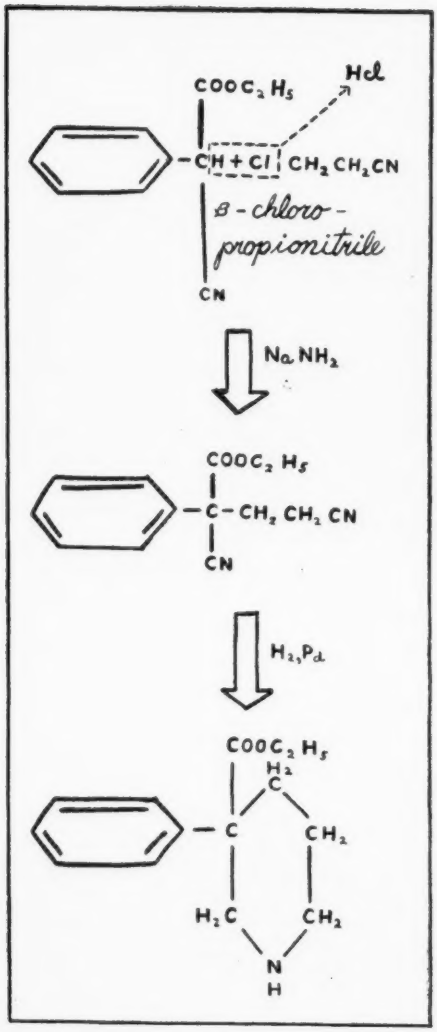
Watch CW Grow — 40,311 copies of this issue printed

Life on the Chemical Newsfront

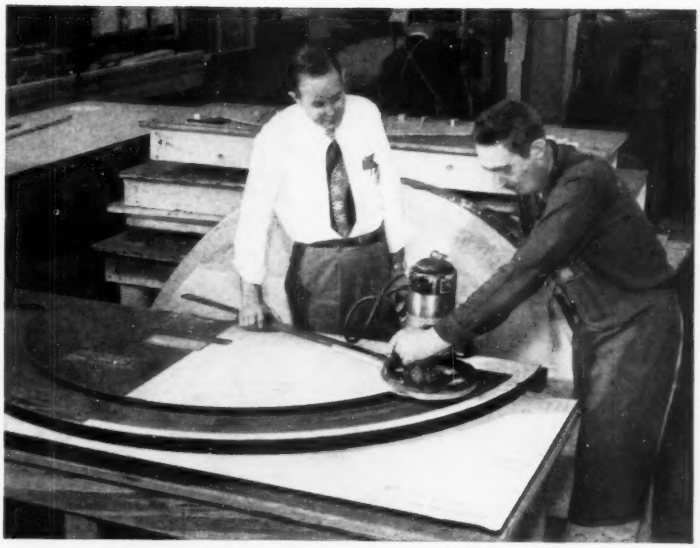
PLASTIC KEYS CONDUCT AN ORCHESTRA OF LIGHT. The Lumitron Lighting Control System permits one operator to play infinite variations in the stage-lighting effects using handles and slide bars molded of BEETLE® *urea plastic*. BEETLE, an excellent dielectric, requires no insulation. Molded-in colors are permanent, permit quick circuit identification for console operator. Developed by Metropolitan Electric Manufacturing Company, the Lumitron has an excellent record of dependable performance. (Plastics and Resins Division)

HOW MORE THAN 5000 CYANAMID CHEMICALS for industry, farm, home and health contribute to everyday living is dramatized in Cyanamid's new exhibit hall at 30 Rockefeller Plaza in New York. Product exhibits, dioramas, slide films and movies combine to present an over-all picture of Cyanamid's diversified chemical activities. Commentaries on the several exhibit areas are provided by pickup phones. Drop in when you are in New York . . . your family will enjoy the exhibit, too!

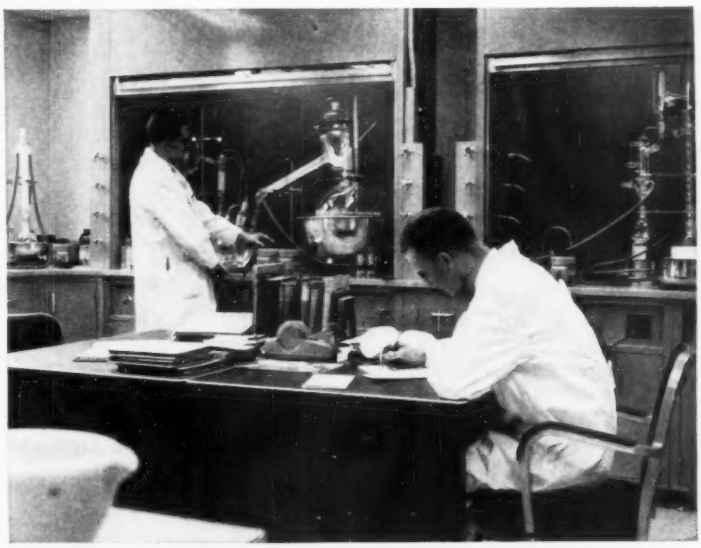


A ROUTE TO HETEROCYCLICS is just one of the reaction possibilities of *β-chloropropionitrile*. This double-ended molecule combines an aliphatic nitrile with an activated alkyl chloride, and either group can be reacted separately. Illustrated is the condensation with an arylacetonitrile to form a glutaronitrile. Catalytic hydrogenation yields the heterocyclic 3-phenyl-3-carbethoxy piperidine. A technical bulletin on β-chloropropionitrile is available on request.
(Market Development Department*)

***NOTE THIS NEW NAME** . . . for the New Products Development Department. The functions of the group are unchanged – providing assistance in developing practical applications for Cyanamid's new chemical products.



NEW ACRYLIC-FIBER PAPERS are showing considerable promise. Their excellent dimensional stability suggests their use in layout or lofting papers for mechanical design work. In filter papers, high wet strength, chemical resistance and lack of absorption lead to efficient filtration. Acrylic fibers, such as Cyanamid's CRESLAN® are polymers or modified polymers of *acrylonitrile*. Increased demand for this reactive monomer is being met by expansion of Cyanamid's acrylonitrile production facilities at Fortier, La. (Organic Chemicals Division and Fibers Division)



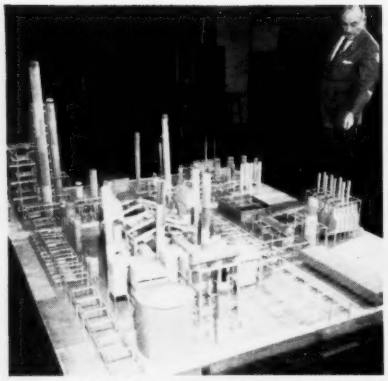
IMPROVED STEROIDS are the goal of highly developed synthesis techniques at Lederle Laboratories. By modifying the chemical structure, the remarkable curative properties of a steroid drug can be maintained while minimizing or eliminating undesirable side effects. A recent successful development of this work is ARISTOCORT® *triamcinolone*. Primary investigation has shown ARISTOCORT, available only on prescription, to have considerable promise in a widening field of steroid therapy. (Lederle Laboratories Division)

CYANAMID

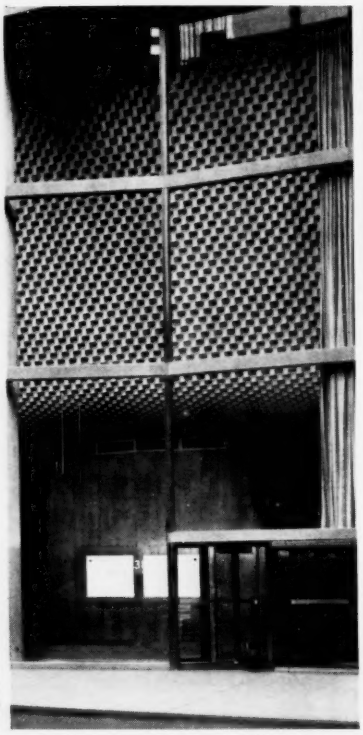
AMERICAN CYANAMID COMPANY
30 ROCKEFELLER PLAZA, NEW YORK 20, N. Y.

For further information on these and other chemicals, call, write or wire American Cyanamid Company

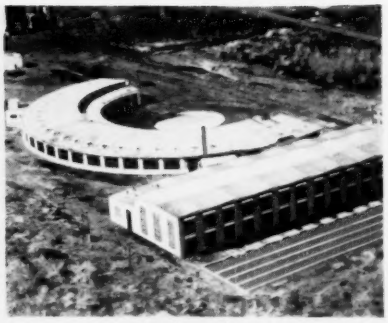
This is one of a series of advertisements on Lummus' world-wide facilities



200,000,000 lb. per year ethylene plant

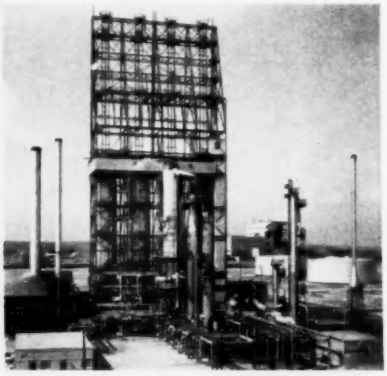


The Lummus Company headquarters
385 Madison Avenue, New York, N. Y.



Beryllium plant

High pressure acetylene chemicals plant



600 ton per day coking unit

Lummus New York is headquarters for design, engineering and construction

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The Lummus Company headquarters are at the business crossroads of the world in New York, ready to coordinate the engineering skills of over 3,000 permanent employees located in seven branch offices and subsidiaries throughout the world.

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In addition, Lummus maintains a 150,000 square foot Engineering Development Center in Newark, N. J., to bridge the practical gap between laboratory research findings and commercial plant operation. The Center has extensive pilot plant facilities in operation, and is equipped for designing and building new units.

Several recent domestic projects of The Lummus Company (pictured above) are: a 200,000,000 lb. per year ethylene plant; the world's first full scale, high-pressure acetylene chemicals plant; a beryllium metal plant; and a 600 ton per day coking unit designed for the heaviest charge ever fed to a coker.

See Lummus on your next project.

Branch offices of The Lummus Company are located at Washington, D. C.; Chicago; Houston, and Baton Rouge.

Subsidiaries are in Montreal, Caracas, London, Paris, The Hague and Bombay.

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ENGINEERS AND CONSTRUCTORS FOR INDUSTRY
385 MADISON AVENUE, NEW YORK 17, N. Y.

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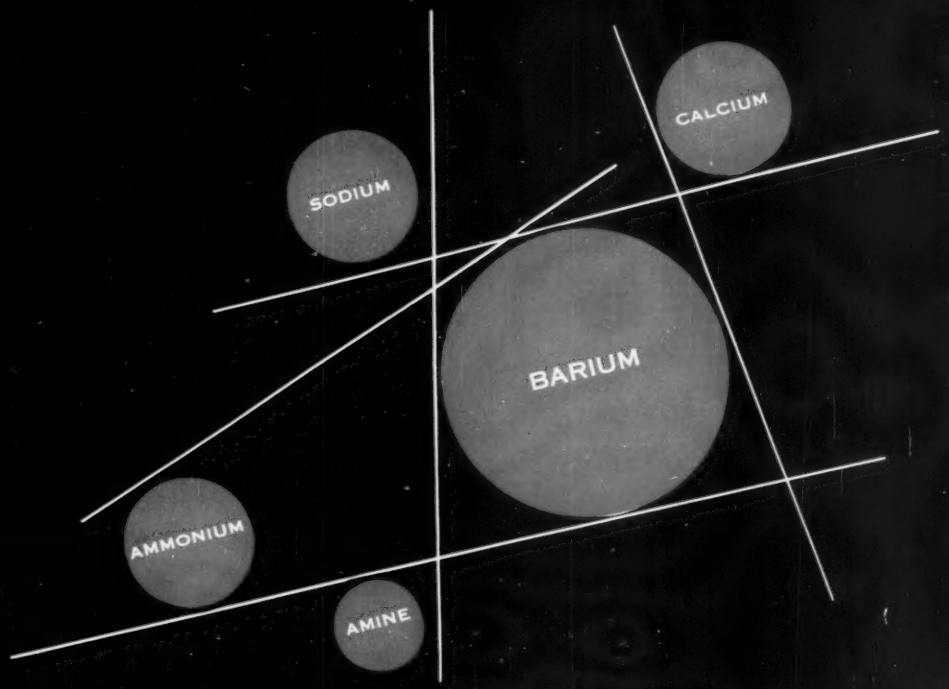

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For additional information, write:
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TITANIUM PIGMENT CORPORATION

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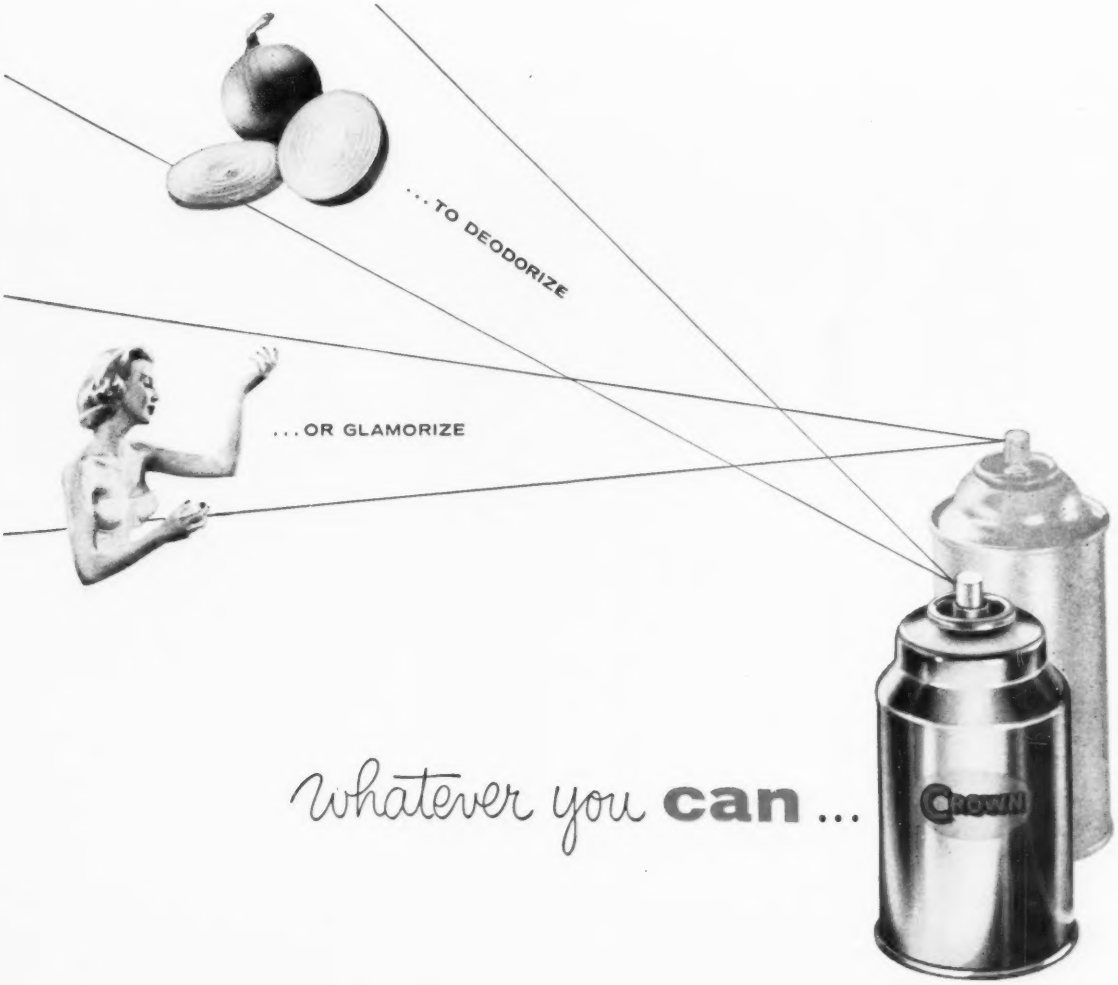

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For pressurized room fresheners or personal deodorants—for literally hundreds of household items and toiletries such as soaps, cleansers and polishes—*can* with CROWN, the only source for Spra-tainers . . . fabricated or seamless.

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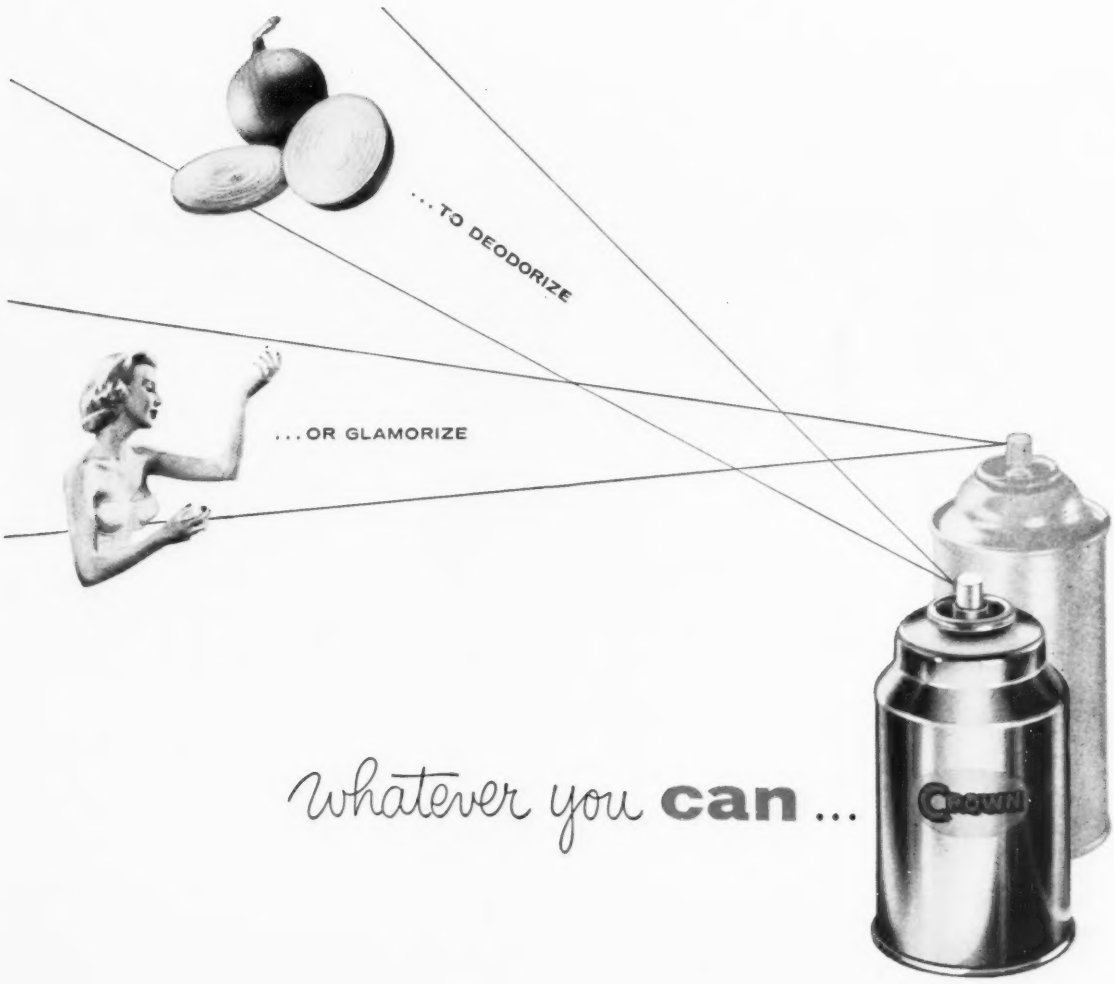

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FORMULA: $CO(NH_2)_2$

Typical Analysis for Crystal Urea:

pH (10% solution at 20° C.)	8.3
Moisture	0.25%
Ash	11 ppm
Free Ammonia	4 ppm
Iron	0.4 ppm
Color, APHA (10 gm. in 100 ml. methanol)	2
Turbidity, APHA (50 gm. in 100 ml. water at 25° C.)	5 ppm

Typical Analysis for "Shotted" Urea:

pH (10% solution at 20° C.)	9.4
Moisture	0.17%
Ash	35 ppm
Free Ammonia	150 ppm
Iron	0.9 ppm
Color, APHA (10 gm. in 100 ml. methanol)	2
Turbidity, APHA (50 gm. in 100 ml. water at 40° C.)	7 ppm

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MISSISSIPPI
Jackson — F. H. Ross & Co.

MISSOURI
Kansas City — Barada & Page, Inc.
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St. Louis — Missouri Solvents & Chemicals Co.

NEW JERSEY
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Paterson — Brown Chemical Co., Inc.

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Hicksville, Long Island — National Oil & Supply Co.
New York — Merchants Chemical Co., Inc.

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Greensboro — F. H. Ross & Co.
Raleigh — F. H. Ross & Co.

OHIO
Cincinnati — Merchants Chemical Co., Inc.
Cleveland — Ohio Solvents & Chemicals Co.
Columbus — Merchants Chemical Co., Inc.

OREGON
Portland — Van Waters & Rogers, Inc.

PENNSYLVANIA
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Erie — Western Penna. Chemical Co., Inc.
Middletown (Harrisburg) — Western Penna. Chemical Co., Inc.
Philadelphia — Pioneer Salt Co.

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Providence — Borden & Remington Co.
Providence — George Mann & Co., Inc.

SOUTH CAROLINA
Columbia — F. H. Ross & Co.
Greenville — F. H. Ross & Co.

TENNESSEE
Chattanooga — Burkart-Schier Chemical Co.
Knoxville — Burkart-Schier Chemical Co.
Knoxville — F. H. Ross & Co.
Nashville — Burkart-Schier Chemical Co.

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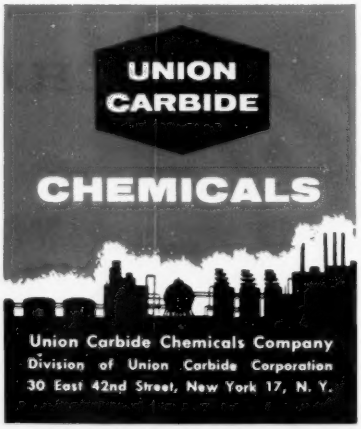
UNION CARBIDE
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Union Carbide Chemicals Company
Division of Union Carbide Corporation
30 East 42nd Street, New York 17, N. Y.

In Canada: Carbide Chemicals Company, Division of Union Carbide Canada Limited, Montreal.

We've Taken Your Picture

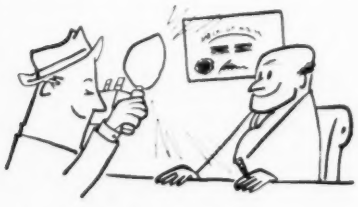
You're 43 years old, a college graduate, you make $13,137 a year, and you are a management man in the chemical process industries.

All this is true, that is, if you are the median CHEMICAL WEEK subscriber.

Believing heartily that a magazine can be no better than its knowledge of the audience it serves, we have just completed a survey of 1,000 individual subscribers. The sample was picked in such a way that it represents an accurate cross-section of our readership among manufacturers, independent laboratories, consultants and government agencies. Our research organization received 790 completed questionnaires—a high 79% return.

Over 80% of you subscribers are in your middle, most active years: 31 to 60; 10% are older, 9% are younger.

Again, over 80% of you finished college. Of those who graduated, 38% took a degree in chemistry and 34% are chemical engineers; and more



'It's most likely that you are a management man.'

than 41% of you took higher degrees —17% M.A. or M.S. and 24% Ph. D.

Five-figure incomes are enjoyed by 70% of you, and a quarter of you make $20,000 or more.

So much for you personally; now let's look at your job. Chances are (57%) that you work for a firm making chemicals and allied products. Or you may be (30%) with a process industry such as pulp and paper, petroleum refining, or rubber. The remaining 12% of you are consultants, with a government agency, or in a research organization.

You may be in general management (35%), research and development (32%), production, engineering, design and construction (17%) or purchasing and sales (25%). If you add those up, it's clear that 9% of you have more than one function.

But whatever your area of operation may be, you're most likely a management man. Five out of six

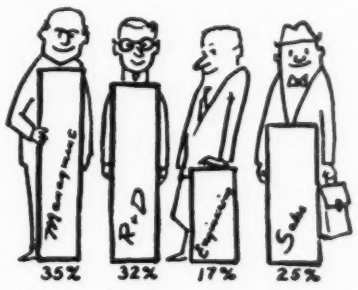
'Sixty percent of you supervise five or more employees.'

admit to having at least one subordinate, while 60% of you supervise five or more employees.

As a management man, you're listened to in the decision-making circles of your company. Only one out of seven of you claims no participation or influence in purchasing decisions. And if your company decides to build a new plant, more than half of you (52%) will participate in the site selection.

And many of you are not confined to the interests of your own company: a full 18% of you are officers or directors of at least one other firm.

It gratifies us that you seem to like CHEMICAL WEEK. About three-quarters of you (77%) claim to read every issue, and 62% of you read it the day it arrives or within a day or two. You spend some time with it, too: 79% devote a half-hour or more to an issue, whereafter 43% of you pass it along to one or more additional



'You may be in general management, research, engineering or sales.'

readers. And some of you must take it home to read: 58% receive it at the office or plant, but 61% of you do at least some of your reading at home. And over three-quarters of you (77%) clip out a story or an ad and pass it on to someone else in your company for information or action.

All in all, your composite picture shows a responsible man in a responsible job in the chemical process industries—a man that's mature, well-educated and well-heeled. We're glad you turned out that way because that's the kind of man we've designed CHEMICAL WEEK to serve. If you'd like a copy of the complete report, drop us a line.—THE EDITORS.

CNIT Supporter

TO THE EDITOR: As a frequent reader of your most informative magazine I noted a very controversial article, "New Mexican Trade Force." (*Oct. 12, '57*). . . .

As a citizen of the U.S.A., with a family chemical background in chemical industry for 126 years, I am engaged in the Mexican chemical industry in an administrative capacity. I have had interests in Mexico for 17 years. Therefore, permit me to inform you about CNIT . . .

All chemical and other Mexican industry honestly conducted for the betterment of Mexico finds infinitely more governmental, trade association, and financial assistance than would an industry of similar size or importance in the U.S.A.

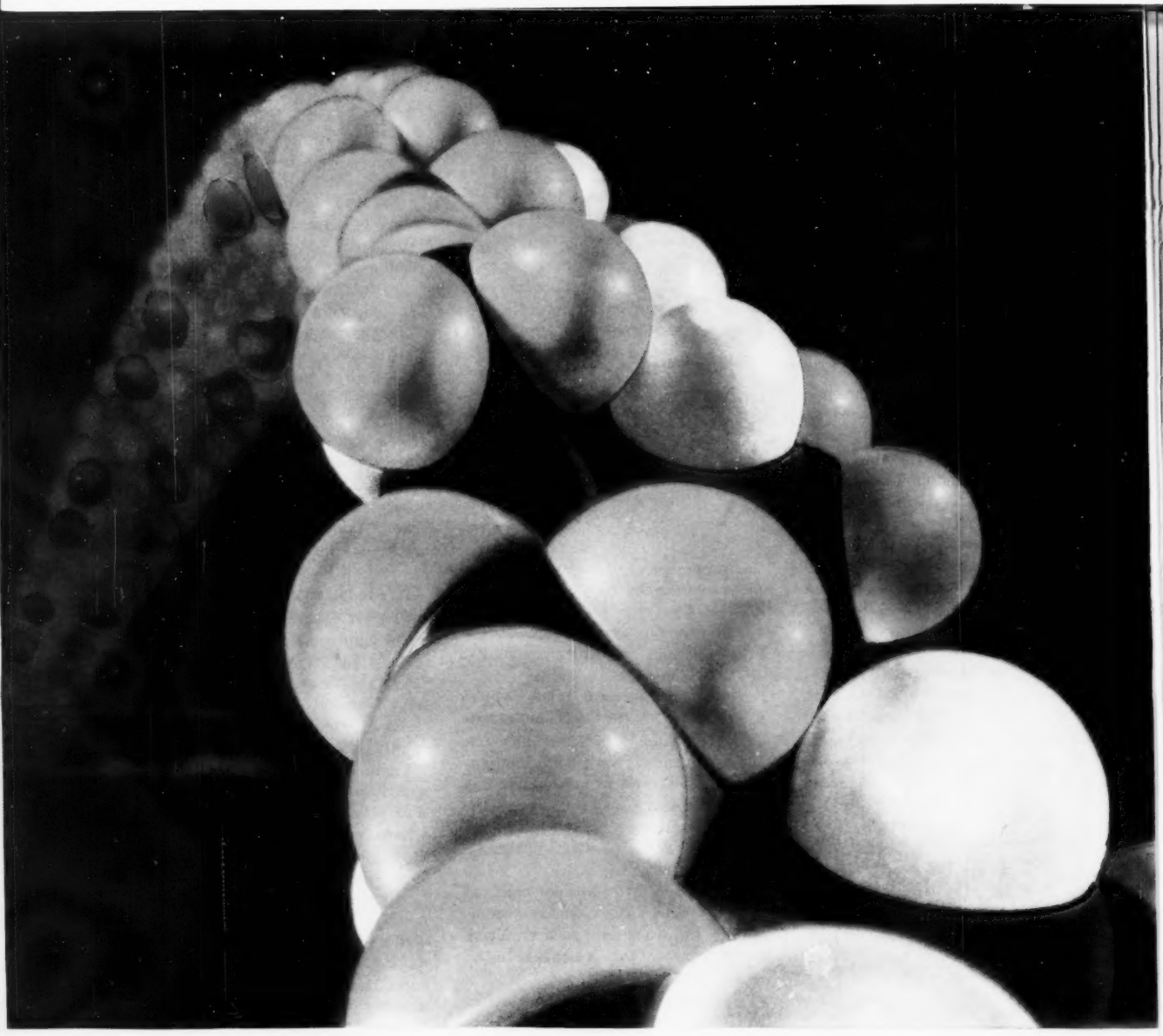
Any honest and intelligent effort for the betterment of the national economy cannot possibly be dissatisfied with the manner in which CNIT aids industry and this economy.

CNIT is honestly opposed to the destruction or unbridled dissipation of natural resources, having learned a good lesson from the U.S.A. . . .

There are 625 members of the chemical industry in CNIT who recently have signified their written satisfaction with the manner in which CNIT manages their affairs. . . .

No anti-U.S.A. forces exist in CNIT; much cooperation is received from U.S.A. manufacturers, also advice and financial investment. . . .

Could it be that some big U.S.A. interests are seeking extra and special concessions and that they are disap-



VINYL MONOMERS . . . endless possibilities, thanks to polymer chemistry

Vinyl acetate . . . vinyl propionate . . . methyl isopropenyl ketone . . . and now acrylic acid esters . . . these Celanese monomers are starting points for practically endless product improvements. They have already enabled production of better binders for non-woven fabrics and for water and grease-resistant coatings. They have improved plastics . . . they have improved the properties of emulsions for latex paints, leather, paper and textiles . . . they have enhanced properties of synthetic fibers and rubbers.

These are but a few of the improvements engendered by the Celanese series of monomers. And Celanese research, development and production know-how promise more and better basic materials for polymer chemistry. The new acrylic acid esters, for example. The unit for their production is nearing completion and soon will be "on stream," supplying acrylates in commercial volume.

Constant research for more productive basic organic chemicals...availability of a vast supply of raw materials to keep production in continuous volume...these are the factors upon which Celanese bases its service to industry. Celanese Corporation of America, Chemical Division, Dept. 652-B, 180 Madison Avenue, New York 16, N.Y. Celanese®

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Celanese CHEMICALS

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Export Sales: Amcel Co., Inc., and Pan Amcel Co., Inc., 180 Madison Ave., N. Y. 16.

pointed that they cannot throw their weight around quite effectively?

The chemical industry in Mexico receives excellent recognition and representation and is coddled with tax exemptions, customs revisions [etc.] . . . No industry in the world could ask for more.

An actual examination of the facts in this matter will reveal that CNIT is a Mexican chemical manufacturer's best friend. . . .

VICTOR R. KOHNSTAMM
V. & E. Kohnstamm, S. A.
Mexico, D. F.

Reader Kohnstamm likes CNIT. The fact remains, nevertheless, that over twoscore firms, both Mexican- and U.S.-owned, are convinced that they can do better in their own chemical organization.—ED.

An Erroneous "r's"

TO THE EDITOR: May I take this opportunity to compliment you on the excellent article (*Jan. 11*) describing the competitive situation in the sale of fluorocarbon refrigerants in this country. You have succeeded in describing a most complex marketing system in a very clear and concise manner, at the same time conveying in the tone of your article the dynamic competition that now exists in this market.

One detail, however, of our recent change in distribution system has been inaccurately described. You state (*column 1, page 86*) that Du Pont "salesmen will pick the wholesalers' customers, be responsible also for evaluating wholesaler performance." . . . The customer selection . . . was the selection of those wholesale outlets that will handle our Freon refrigerants. Obviously, we have no intention of interfering in any way with the wholesaler's selection of his customer and our system is designed to assist the wholesaler in every way possible in serving his customers.

We also note the statement in the same column that "By its new arrangement, Du Pont sidesteps the pitfalls (example: price cutting) of inadequate distribution control, which is sometimes a problem in agent systems." It should be noted for the record that we publish a suggested resale price as a guidance to the wholesaler in pricing our product in his local market. However, the wholesaler is free to price the Freon according to his own schedule and is under no obligation to follow our suggested resale prices. It was not our intention in revising our distribution system to interfere in any way with the free pricing of our product in the open market. . . .

JOSEPH C. HOOPES
Manager—Field Distribution
Freon Products Division
E. I. du Pont de Nemours & Co.
Wilmington, Del.

By a transcribing error, "wholesale customers" became "wholesaler's customers." We're glad to set the record straight.—ED.

Vinyls Report

TO THE EDITOR: The special markets report, "U.S. Vinyl Resins Output" (*Nov. 16, '57*) . . . is undoubtedly the finest and most complete report on vinyl resins development and market potential that we have ever seen. . . .

S. M. FERRER
S. M. Ferrer Advertising
Newark, N.J.

Benzene vs. Benzine

TO THE EDITOR: . . . In an item (*Dec. 28, '57, p. 28*) on the new synthetic phenol plant at Grangemouth, Stirlingshire, it is stated that British Hydrocarbon Chemicals Ltd. is "already making benzene at Grangemouth." This is not true. Benzine, an aliphatic hydrocarbon, is produced in the normal operations of the oil refinery at Grangemouth; but benzene, the aromatic hydrocarbon required for phenol production by BHC, is obtained from coal tar and brought in. . . .

A. F. B. NEAL
The Distillers Co. Ltd.
London

CW welcomes expressions of opinion from readers. The only requirements: that they be pertinent, as brief as possible.

Address all correspondence to: H. C. E. Johnson, Chemical Week, 330 W. 42nd St., New York 36, N.Y.

MEETINGS

American Management Association, annual marketing conference, Hotel Statler, New York, Feb. 10-12.

National Society of Professional Engineers, spring meeting, Michigan State University, East Lansing, Mich., Feb. 13-15.

American Society for Testing Materials, committee Week, Hotel Statler, St. Louis, Feb. 10-14; chemical industry luncheon, Feb. 12; symposium on ozone problems, Feb. 10.

American Institute of Mining, Metallurgical and Petroleum Engineers, annual meeting, Hotel Statler and Hotel Sheraton-McAlpin, New York, Feb. 16-20.

Rubber Manufacturers Association, Washington rubber group decennial banquet, National Press Club Ballroom, Washington, Feb. 18.

American Management Association's Research and Development Div., special conference on how to adjust to changing business conditions, Biltmore Hotel, New York, Feb. 19-21.

Chemical Institute of Canada, 12th divisional conference, protective coatings subject division, Toronto, Feb. 20; Montreal, Feb. 21.

American Society of Mechanical Engineers, International Gas Turbine Power Division conference and exhibit, Shoreham Hotel, Washington, Mar. 3-6.

Association of Consulting Chemists and Chemical Engineers, symposium and banquet, Shelburne Hotel, New York, Mar. 5.

New York Board of Trade, Drug, Chemical and Allied Trades Section, 32nd annual dinner, Waldorf-Astoria Hotel, New York, Mar. 6.

1958 Nuclear Congress, International Amphitheatre, Chicago, Mar. 17-21.

National Association of Corrosion Engineers, 14th annual conference, Civic Auditorium, San Francisco, Mar. 17-21.

Society of the Plastics Industry, 15th annual Pacific Coast section conference, El Mirador Hotel, Palm Springs, Calif., Mar. 26-28.

American Chemical Society, California section, chemical exposition, Civic Center Exhibit Hall, San Francisco, Apr. 13-17.

American Society of Mechanical Engineers, annual design engineering show, International amphitheatre, Chicago, Apr. 14-17; annual national spring meeting of the American Welding Society, Kiel Auditorium, St. Louis, Apr. 15-17.

American Oil Chemists' Society, annual meeting, Peabody Hotel, Memphis, Tenn., Apr. 21-23.

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Business
Newsletter

CHEMICAL WEEK
February 8, 1958

Flushed with its share of credit for U.S.'s first successful satellite (*see also p. 30*), the chemical process industries this week stand out as one firm foundation for U.S. technological and economic strength. Latest expansion notes on this fast-growing segment of industry:

• Sinclair Chemicals this week is starting to build a 50-million lbs./year *p*-xylene plant at Houston, Tex. The principal outlet is expected to be Du Pont's dimethyl terephthalate plant now under construction at Old Hickory, Tenn. (*CW, Feb. 1, p. 25*) The new facility—scheduled to be in operation in the first quarter of '59—will be integrated into the refining operations of Sinclair Refining Co. at Houston, and will also produce about 60 million gal./year of pure toluene and mixed xylenes.

• The West Coast's first plant for making ethylene oxide condensation products is expected onstream in about two months. Process Chemicals Co. (Los Angeles) will produce ethoxylated compounds in a unit, with maximum capacity of 4.5 million lbs./year—and Nopco Chemical Co. is still studying plans to build a similar unit at its Richmond, Calif., plant (*CW Business Newsletter, Nov. 16, '57*). Process Chemicals' compounds are slated for use in nonionic detergents and emulsifiers for cosmetics, cleaning compounds and industrial emulsifiers.

• Capacity of U.S. refineries is rising nearly 3%/year in terms of crude oil input; and the increase is much higher in terms of output of upgraded petroleum and petrochemical products. A National Petroleum Council committee predicts these boosts in process capacities: catalytic cracking, 11.6%; catalytic reforming, 49%; hydrogen treatment, 84%.

•

Manufacturing Chemists' Assn. is expanding membership of some of its technical and functional committees to include representatives of newly affiliated companies that specialize in some of the more recently commercialized extractive metallurgy processes. MCA notes that 11 metals producing companies have been members of the organization for some time, and that within the past six months, eight more metals makers have joined.

Still other metals concerns have applied for MCA membership. One of these is Lithium Corp. of America—and this apparently means the end of the one-year-old American Lithium Institute (*CW, March 23, '57, p. 29*). American Potash & Chemical and Foote Mineral have already joined. All three will take part in MCA's reactive metals activities. Since their interests extend to diverse other products, MCA's over-all program appears to be in a better position to serve them. Upon completion of two research projects and publication of a monograph on lithium, American Lithium Institute will become inactive.

•

Current financial health of most chemical process companies is good, judging from recent reports of sales and earnings at record or near-record levels.

The sales trend-line for some chemical companies is up sharply and the earnings curve is leveling off at a high plateau. Union Carbide's sales were up 5.3% but earnings dropped 8.5%, compared with '56 results. However, Carbide is preparing for a still bigger future by putting aside—as depreciation and amortization charged against gross income—$120.4 million for plant replacement and expansion. This is nearly 6% more than the corresponding charge-off last year. Hercules Powder's operating revenues were up 4% and net income was up 2.2%. For Canadian Industries Ltd. and its subsidiaries, consolidated sales rose 10% while earnings inched up 1%. For Spencer Chemical—whose fiscal year ends June 30—net sales over the last six months of '57 were up 13% over the corresponding half of '56 and earnings climbed nearly 3.3%.

•

Facing up to the facts of riskier economic weather, Diamond Alkali is "trimming ship." It has informed the U.S. Army that by April 27 it will be out of the chlorine-caustic plant it has been leasing at the Pine Bluff, Ark., arsenal since '47. The firm has sold the Diamond Black Leaf Products Division acquired from Virginia-Carolina Chemical in '55 and has sold its plants at Waco, Tex., and Richmond, Va., which were previously used for formulating Black Leaf products. Diamond says its Muscle Shoals, Ala., and Deer Park, Tex., plants can more than make up for loss of chlorine-caustic production at Pine Bluff, and do it more efficiently. The DDT unit at Pine Bluff—subleased by Diamond to Niagara Chemical Division of Food Machinery and Chemical—is included in the turnback. Taking over the Black Leaf operation: Black Leaf Products Co. (Chicago), a newly formed Illinois corporation.

•

While the Army is pondering what to do with its Pine Bluff chemical plant, General Services Administration is about to sell its electrometals plant near Spokane, Wash., to Pacific Northwest Alloys Co. Agreed-on price is $3.2 million, not including the dolomite quarry at a separate location. Products: ferrosilicon, ferromanganese, ferrochrome.

•

Thiokol Chemical is not losing interest in its industrial chemical business—notwithstanding its two recent moves to beef up its position in rockets and missiles. Chemicals have been the company's most profitable activity. After arranging to acquire Reaction Motors from Olin Mathieson and other interests, Thiokol told *CW* of a new effort to boost its chemical business:

Thiokol and Standard Oil of New Jersey are working together to develop new markets for butyl rubber. If they succeed to the point where a new source of supply is needed, it's contemplated that Petroleum Chemicals, Inc. (Lake Charles, La.), will build a new plant, with Thiokol as the marketing partner.

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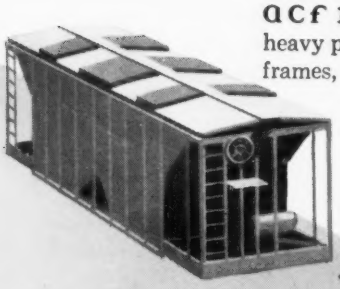
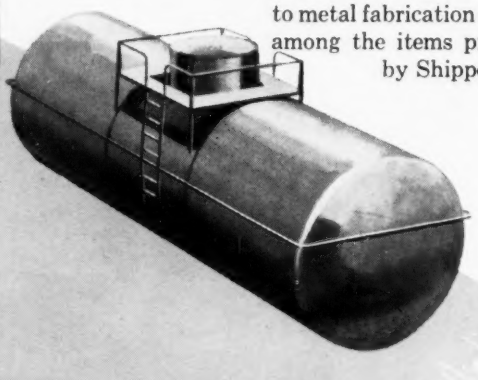
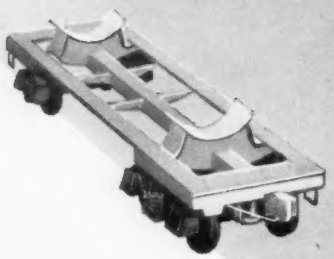


At Milton, Pa., Advanced Products Div. of ACF Industries—A modern plant devoted to metal fabrication and welding. Tank cars are among the items produced, and are supplied by Shippers' to industry.





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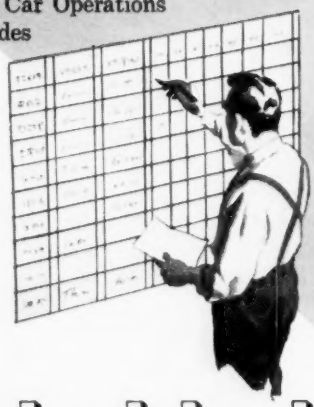

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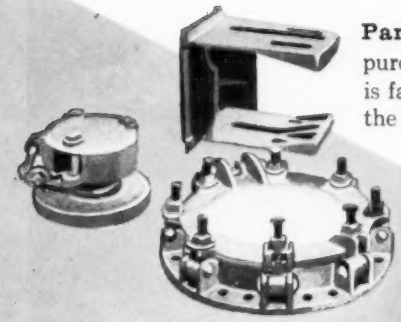

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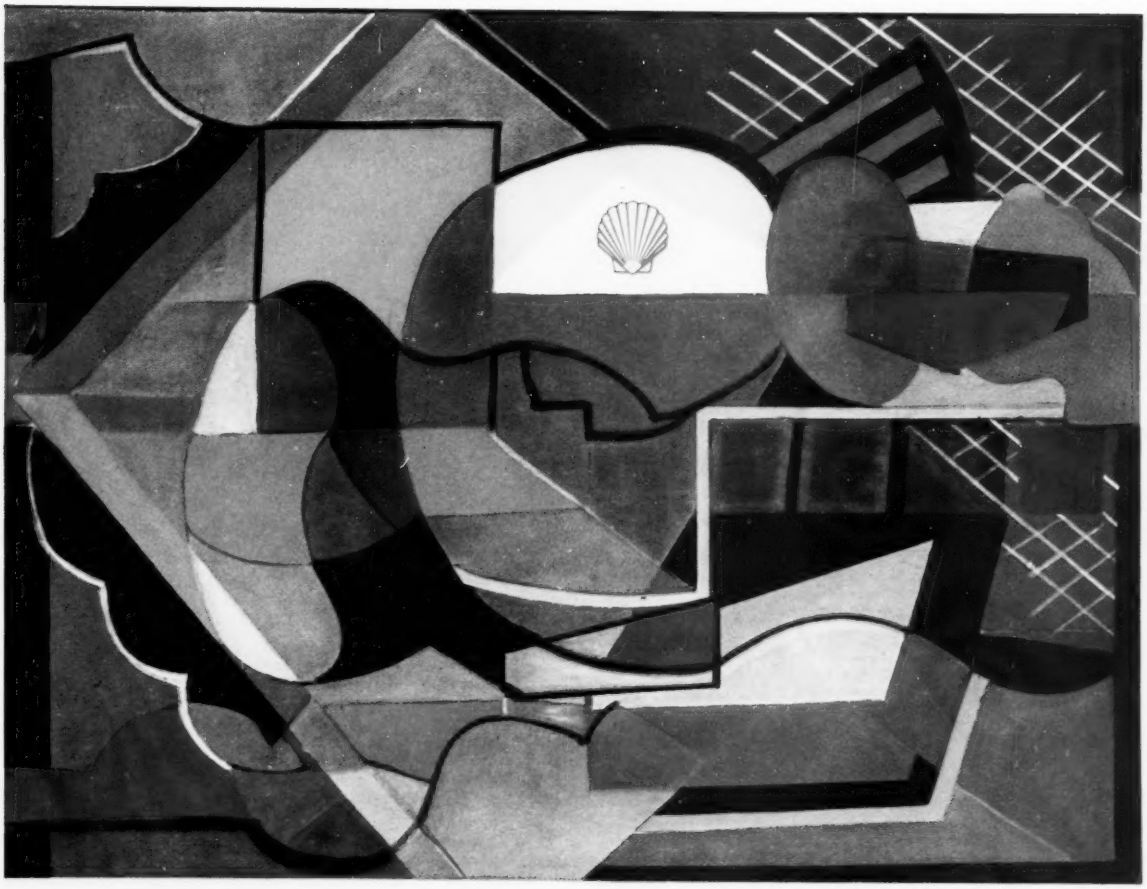

SYNTHESIS — an interpretation by Barton

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- Allyl Chloride
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- Epichlorohydrin
- Ethyl Chloride
- Methyl Isobutyl Carbinol
- Styrene Monomer

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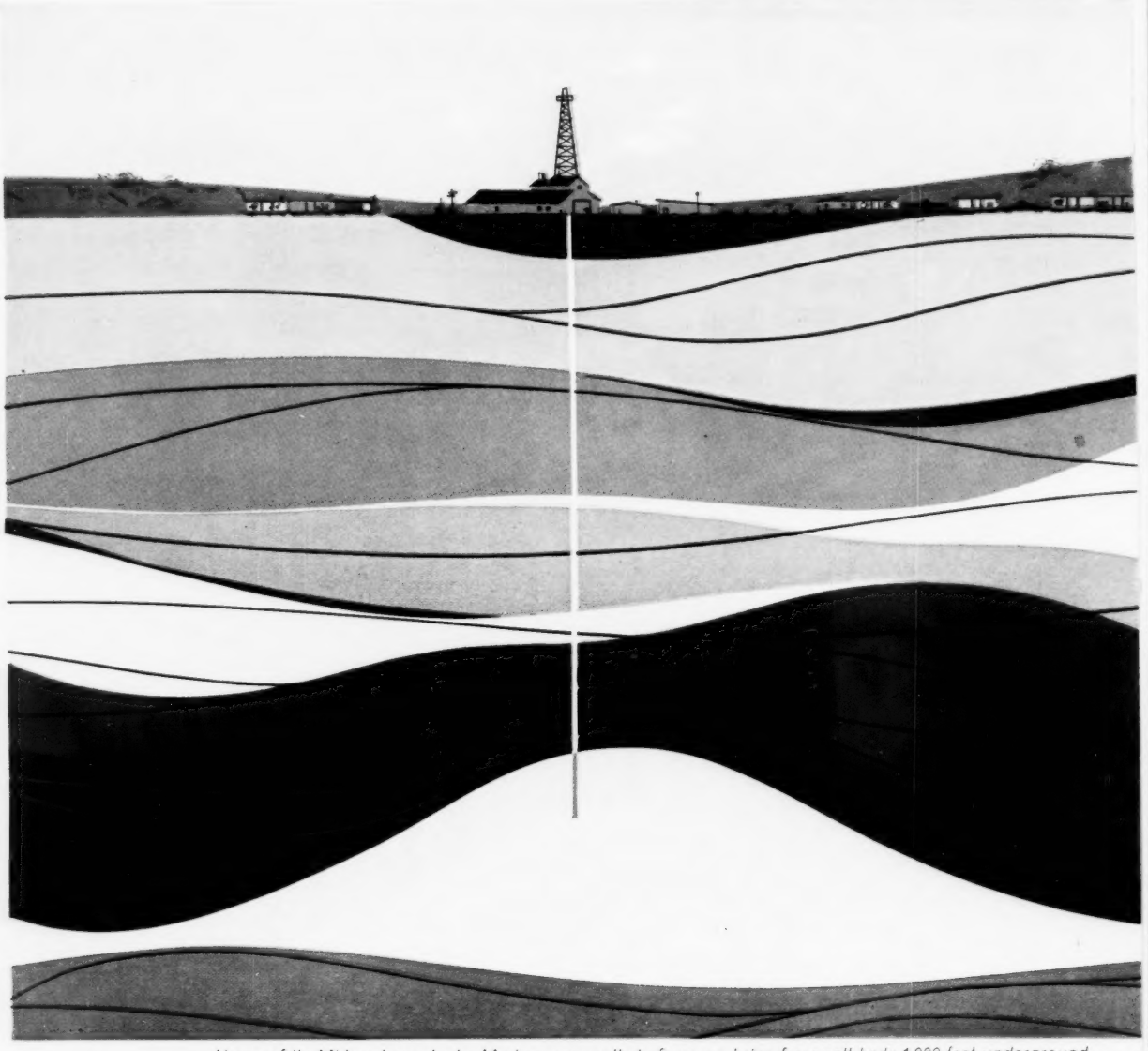

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Only Morton can offer you the right salt

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for every industrial use, coast to coast

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At Baton Rouge, cat crackers of Esso Standard Oil's refinery—largest in the U. S.—turn out a vast flow of . . .

Chemical Week
February 8, 1958

Propylene: By-product with Bright Future

With new producers poised on the threshold of polypropylene production, the outlook for propylene as a chemical raw material assumes new significance this week.

Most enticing plus value in propylene's future right now is the tough new plastic, polypropylene.

Hercules has just begun production in a unit at its Parlin, N. J., works. If the plastic — and other propylene uses—fulfills expectations, 1960 may see up to 200 million lbs. a year of propylene used in chemical manufacture.

In addition to plastic production, there's increasing production of such materials as phenol and acetone ahead. And use in making items like glycerine and acrolein should move propylene further into the commercial "big time." Perhaps the most intriguing item in propylene's future is the possibility that polypropylene elastomers may find a niche as competition for today's synthetic rubber materials. If this discovery can be commercialized, the propylene it would consume might represent the largest single chunk of the hydrocarbon used for chemical purposes.

First with Plastic: Hercules' new propylene plant, which started producing late last year (*CW, Dec. 7, '57, p. 31*), is, of course, the bellwether of propylene's future growth.

Hercules is getting its propylene raw material from Sinclair Chemical's newly complete propylene purification unit located near Sinclair Oil's Marcus Hook, N. J., refinery units. This purification setup is also tabbed as "the first of its kind in the U. S." by Sinclair spokesmen.

But neither Hercules nor Sinclair expects to be alone in its chosen field for very long. There are persistent reports that at least two big chemical companies are well advanced, have their plans to make the new plastic in almost final form. Among the likely candidates: Dow Chemical and Union Carbide. Possible locations: along the Gulf Coast.

While these reports remain unconfirmed, almost every company making polyethylene has discussed propylene costs with refinery representatives. A check of many possible polypropylene producers reveals that most are looking to see if it's possible to improve the qualities of polyethylene to match some of the reported advantages of polypropylene in melt index, moldability and tensile strength.

Peril in Patents: And they're a little wary of the patent situation. It's no secret that Du Pont's success in getting a composition-of-matter patent on linear polyethylene (*CW, Dec. 28, '57, p. 25*) raised the eyebrows of some of the old-line industry men, who felt that no one could get a valid composition-of-matter patent on the item. And the status of polypropylene patents may be more complicated.

Chemical Uses for Propylene, 1957

(estimated)

Isopropyl alcohol
(1 billion lbs./year)
- Acetone

Propylene trimer and tetramer
(400 million lbs./year)
- Detergents
- Plasticizers
- Gasoline

Allyl derivatives
(100 million lbs./year)

Propylene oxide and glycol
(75 million lbs./year)

Oxo feeds
(25 million lbs./year)
- Butyraldehyde
- Butyl alcohol

Hercules, as a commercial frontrunner, feels it has a double measure of protection. It has filed its own patent applications and, as a licensee of Germany's Karl Ziegler, has a protection against royalty claims by Italy's Montecatini. This firm has entered into an agreement with Ziegler by which their patents are pooled—thus giving all Ziegler licensees a measure of protection—at least in the United States.

Montecatini was apparently the first firm to start making polypropylene using Ziegler catalysts; it has already set up a plant at Ferrara, Italy, and reportedly has plans for one in this country. Some U. S. experts doubt that the Ferrara unit would be considered a "full scale" one by U. S. standards.

Why There's Optimism: Confidence in polypropylene which is shared at least by Hercules and Montecatini, is buoyed further by general agreement that polypropylene may have an edge over other thermoplastics because of its low density and its resistance to heat. However, there's still some skepticism from those who say that many of its reported characteristics are based on accelerated tests—not on actual service (*CW Technology Newsletter, Dec. 7, '57*).

One potentially big factor in raising makers' hopes is the matter of cost. The usual grades of propylene, currently selling at less than 5¢/lb., are available at almost any refinery—though purifying it (mainly by removing propane) to the degree needed to make polypropylene adds to the total cost. Purification isn't expected to increase price more than 2¢/lb.—assuming propylene would be needed in large commercial quantities.

Right now, Hercules is selling its polypropylene for 65¢/lb. The company states that as large volume output is reached, "there's no reason why the price of the plastic won't come down." Some price cuts could be expected in months, and ultimately polypropylene should reach a price level equal to or slightly below that of linear polyethylene.

Raw Material Advantages: Propylene itself has the advantage over ethylene, too, in that it can be moved economically by tank car or tank truck. The lower-boiling ethylene can't be moved profitably in this manner, must go through a pipeline.

Most current users of propylene, of course, obtain it via pipeline. This includes most makers of isopropyl alcohol—an item that is far and away

the largest current consumer of the olefin.

The same is also true of Shell Chemical, which will get the propylene raw material it needs for two new multi-million dollar plants it will build at Norco, La., from the refinery streams of the Shell refinery at Norco. The products to be produced in the new units: synthetic glycerine, hydrogen peroxide, acrolein (*CW Technology Newsletter, Jan. 18*).

There's one soft spot in the propylene outlook. The manufacture of detergent alkylate may be demanding less propylene in years to come—a fact due primarily to the decreasing export market. Alkylate is one of the simplest commodities for foreign refineries to make, and with new detergent alkylate units going up in many parts of the globe, U.S. exports—which comprise about a third of total domestic production—will likely decrease.

An Elastic Future? Further in the future, however, looms the possibility that propylene elastomers may go commercial. The polypropylene elastomer usually shows up along with crystalline (i.e., the "normal" plastic) material when propylene is polymerized using Ziegler catalysts. Companies usually adjust conditions to favor the crystalline product. But Hercules and other firms have done some research with the elastomers to find out if they would be good commercial bets.

Though not much is known about these elastomers, it's believed they're similar to butyl rubber in having substantial ozone resistance. Such qualities, say the director of one large rubber research lab, could spur their use in a whole series of rubber products.

Propylene Sources: While most propylene is now coming from refinery streams, it may be that big new demands will make additional production units necessary. If supplies from cat-cracker streams prove inadequate, the next logical step will be to make it by cracking propane in natural gas, say some refinery men.

In any case, it's sure that propylene is gaining favor as a chemical raw material. While only a nominal increase in demand is expected in '58, consumption will likely surge upward by 1960 as other firms join in the polypropylene race—and as other processes utilizing this versatile building block come out of the lab.

Fuel Push Gets Satellite

At 10:48 last Friday night at Cape Canaveral, Fla., the Army's Jupiter C seemed momentarily to sit on its angry orange tail, then took off on a cloud-shattering flight that put the 30-lb. satellite, Explorer, into orbit. As the satellite relentlessly runs its elliptical course around the earth this week, the chemical process industries are listening to some potent arguments about the relative merits of solid and liquid fuels.

Resolution of these arguments will in large measure determine the industry's future research emphasis on missile fuels.

Enthusiasts of both the liquid and the solid schools are taking advantage of the occasion to wax exuberant. Liquid-fuels experts point out that it was the liquid-propelled Redstone missile in the first stage that provided the satellite with the first, big necessary push. But the solids proponents point out that the second, third and fourth stages were made up of solid-propellent rocket clusters. They add that such clusters using liquid propellents would be just about impossible. Utilization in this manner of solid fuels is the chief difference, they say, between the Army's successful Explorer and the Navy's Vanguard, which fizzled on its first try. (Early this week, it was still on its launching pad awaiting favorable weather conditions for another attempt.)

Substitute for Alcohol: The Army's Redstone is normally propelled by combustion of alcohol with liquid oxygen. In this case, however, the alcohol was replaced by a special fuel, tagged Hydyne, that permits a 12% boost in thrust and range.

Behind this substitution lies a considerable accomplishment on the part of Rocketdyne, which built the rocket. Normally, it's impossible to substitute one fuel component for another without drastic changes in the engine. The ratio of rocket-to-fuel weight is an important performance consideration. Moreover, if the fuel tank isn't full, "sloshing" is likely to cause problems. To minimize these, the new fuel would have to have the same specific gravity as alcohol.

Not much is being said about Hydyne except that it's based on hydrazine. That could mean that one component is UDMH (unsymmetrical dimethyl hydrazine). In any case, it was developed in a six-month crash research program. Jacob Silverman, supervisor of Rocketdyne's Propulsion Research Thermodynamics Unit and

WIDE WORLD PHOTOS

Exultant scientific trio who helped perfect Explorer are William Pickering, California Institute of Technology; James Van Allen, University of Iowa; Wernher Von Braun, chief of the army project.

off Ground

leader of the research effort, calls it "a clever adaptation of known ingredients."

A spokesman for the firm says that its a "unique blending* of two commercially available chemicals that had never before been used at the high thrust levels of rocket engines." After the development work was finished, Rocketdyne farmed out actual manufacture of fuel to several chemical companies.

Sold on Solids: Without minimizing Rocketdyne's contributions, however, solid propellent enthusiasts point out that the Redstone carried it only 200 miles into space and then solids took over. The Army won't confirm it, but the second stage was likely a cluster of 11 rockets—scaled-down versions of the Army's Sergeant, built by the Jet Propulsion Laboratory of the California Institute of Technology. The third stage was probably a cluster of three, and the fourth stage, the satellite itself. Although the fuel was not officially revealed, almost certainly it was a Thiokol rubber binder employing ammonium perchlorate as the oxidizer.

There are a lot of arguments that can be advanced to back up either liquid or solid fuels. But one of the strongest arguments made by solids experts runs like this:

The liquid fuels system is inherently complex, made up of many components. Although it's possible to make each component highly reliable, the large number of components precludes a high degree of reliability for the whole system. Solids systems, by comparison, are elegant in their simplicity. And once development is complete, it's possible to get almost 100% reliability. That's why clusters, such as those employed in the Jupiter C, are feasible only if solids are used.

Their conclusion: A solid-propellent could have been used in place of the Redstone, but it would have been impossible to replace the later stages with liquid-propelled rockets except by employing a far more complicated design.

*But this is not a unique approach. Udetta, a mixture of UDMH and diethylenetriamine, won some attention as a fuel (*CW, Technology Newsletter, Feb. 2 '57*).

Roaring skyward with first U.S. earth satellite is Army's Jupiter C missile.

People like Charles E. Bartley, president of Grand Central Rocket Co. (Redlands, Calif.), and H. W. Ritchey, Technical Director of Thiokol's Rocket Division, have been pressing that viewpoint for some time. Says Ritchey: "Look at the big headlines that have been made in this field—the Explorer, Project Farside, the X-17 (Lockheed's nose-cone test missile), the Polaris—and you'll see that they're all based on solid fuels."

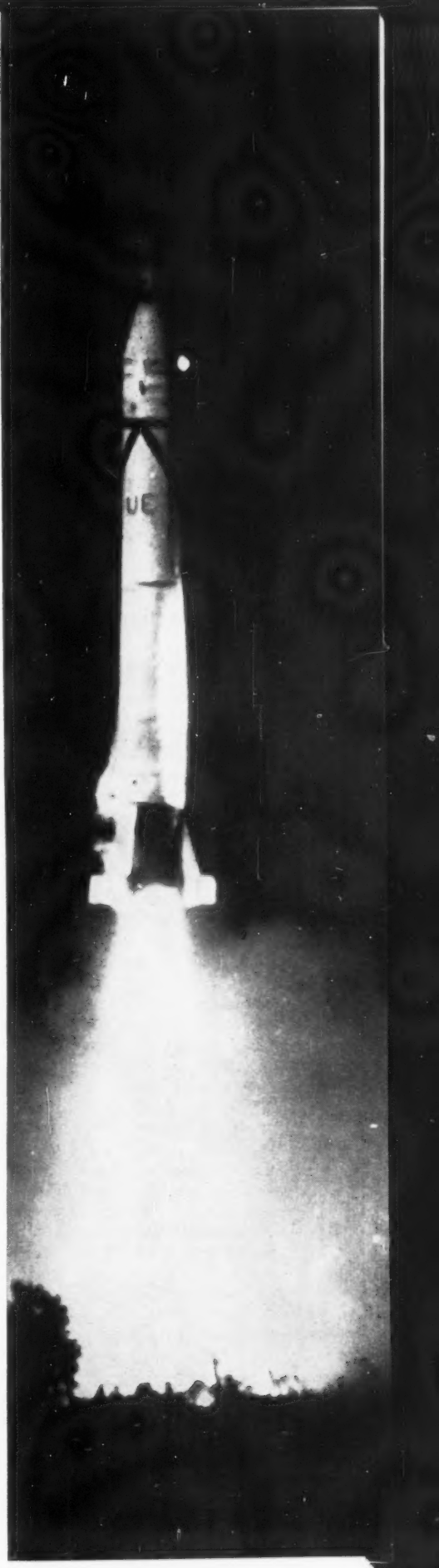
Paul Vogt, assistant chief engineer for Rocketdyne, doesn't agree with that. He says flatly: "In the future, for the ultimate payload all-around performance, liquid fuels will be used. Solid fuels will be delegated to smaller rockets because they are unable to meet the thrust requirements of long-range missiles."

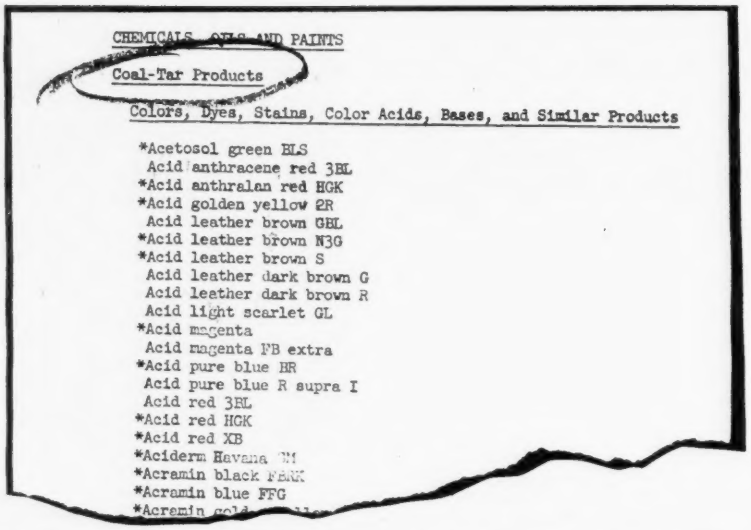
On the Fence: Between the two all-out schools, there's a body of expert opinion holding that the Explorer's success will have no immediate impact directing fuel development toward either the solid or liquid. Says Richard Geckler, manager of Aerojet-General's solid rocket plant: "It's just another step in enlarging the field of rocket use. Over-all research will continue at the same rate on both types." Robert Tripp, executive assistant to the vice-president for the same firm's liquid plant, feels substantially the same way.

High-Energy Solids? Whatever the merits of the two systems, everyone concedes that the solid fuels have come a long way. Ritchey, for one, feels that this is only the beginning. He has done some artful mathematics (*Astronautics, Jan. '58*) showing that it's possible to scale up the solid-fueled Recruit to a large-thrust rocket capable of taking a crew to the moon and back. And he's looking beyond that to high-energy solid fuels.

The liquids people, of course, say that in trying to develop high-energy solid fuels, engineers are running into more complex systems; meanwhile, liquid systems are becoming simpler.

In short, there's a lot to be said on both sides. And chemical companies are pushing forward their development programs on the theory that there'll always be room for both.





CHEMICALS, OILS AND PAINTS

Coal-Tar Products

Colors, Dyes, Stains, Color Acids, Bases, and Similar Products

*Acetosol green BLS
Acid anthracene red 3BL
*Acid anthralan red HGK
*Acid golden yellow 2R
Acid leather brown GBL
*Acid leather brown N3G
*Acid leather brown S
Acid leather dark brown G
Acid leather dark brown R
Acid light scarlet GL
*Acid magenta
Acid magenta FB extra
*Acid pure blue BR
Acid pure blue R supra I
Acid red 3BL
*Acid red HGK
*Acid red XB
*Aciderm Havana W
*Acramin black FBNX
*Acramin blue FFG
*Acramin gold

First page of list of chemicals exempt from new customs valuation.

Tariff Exemption List Grows

Chemical firms this week were scanning the 23 single-spaced pages of the list of chemicals exempt from a new import-valuing formula to see how many of their own products are included.

Starting Feb. 27, *ad valorem* duties on items not on this list will be set by the formula provided in the Customs Simplification Act of 1956. In most cases, that will mean lower duties. A list of products to be exempted from this act was first proposed by the Treasury Dept., and later expanded as a result of suggestions from industry representatives — notably the Synthetic Organic Chemical Manufacturers Assn.

Under the new system, the Treasury will base *ad valorem* duties on "export value"—the price in the originating country at which an item is offered for sale for export. Exempted items will continue to be valued under the present formula, which also takes into account the usually higher "foreign value"—the price at which the item is sold in the country of origin. Under this formula, the U. S. must base its tariff on the higher of the two values.

The final list is permanent *(CW Washington Newsletter, Sept. 28, '57)*. No revisions will be permitted, even for items whose dutiable value drops more than 5%.

Lengthened List: When the Customs Simplification Act was passed, coal-tar chemical producers felt threatened. SOCMA proposed that the exemption list include all finished coal-tar chemicals, which number in the thousands. The preliminary list included only 268 *(CW, Sept. 7, '57, p. 21)*.

Domestic producers were granted 60 days—until Oct. 20—to petition for additions to the list, and the act required that the Treasury Dept. consider industry's views. When the final version of the list appeared, U. S. coal-tar products and product producers heaved a sigh of relief. For it contained 531 coal-tar products and product classes. An additional 231 *(indicated on the list above with asterisks)* had been added to the list by the Treasury.

When queried, Chairman Norman Babcock of SOCMA's customs simplification subcommittee told *CW* the list is "satisfactory."

Plants Change Hands

A government metals plant passes into private hands, a chemical plant reverts to the Army—these are the latest developments concerning government-owned plants built during World War II.

• At Spokane, Wash., Pacific Northwest Alloys Co. is about to buy the electrometals plant at the nearby town of Mead.

• At Pine Bluff, Ark., Diamond Alkali Co. is giving up its lease on the chlorine-caustic and DDT plants in the Army's Pine Bluff Arsenal.

Also pulling out from the latter location is Niagara Chemical Division of Food Machinery & Chemical Corp., which was operating the DDT unit under a sublease from Diamond. As of this week, employees were getting buildings and equipment ready to turn back to the Army on April 27.

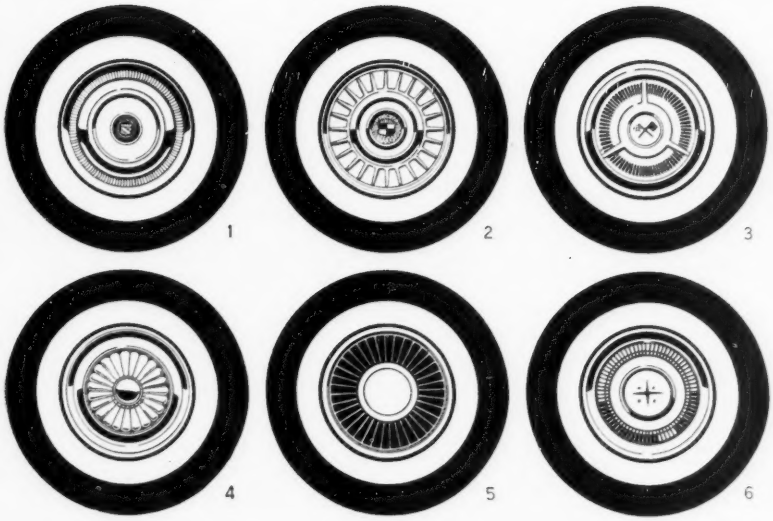
Price Is Right: Pacific Northwest Alloys and the General Services Administration have agreed on a $3.2-million price for the plant at Mead; if a dolomite quarry 120 miles distant is included, the price will be higher. The Mead plant was built in 1943 for about $20 million to produce ferrosilicon and magnesium ingots at the rate of 48 million lbs./year each.

Pacific North West has operated the ferrosilicon section of the plant since 1948. In 1953, it invested about $1.5 million in converting the magnesium facilities for production of ferrosilicon, ferromanganese, and ferrochrome. Normally, about 400 men are employed in the plant, but the present work force is only about 125.

Pine Bluff Story: The chemical plant at Pine Bluff was built in 1942, operated by the Army through '45, and leased to Diamond in '47. Diamond has operated the plant continuously since then, and has made a number of capital improvements to increase both capacity and efficiency.

One major factor behind Diamond's move: Niagara Chemical's decision last October to stop making DDT there. A substantial slice of Diamond's chlorine output had been going to the DDT unit, and Diamond was unable to develop new markets in the Pine Bluff area to make up for loss of that convenient outlet.

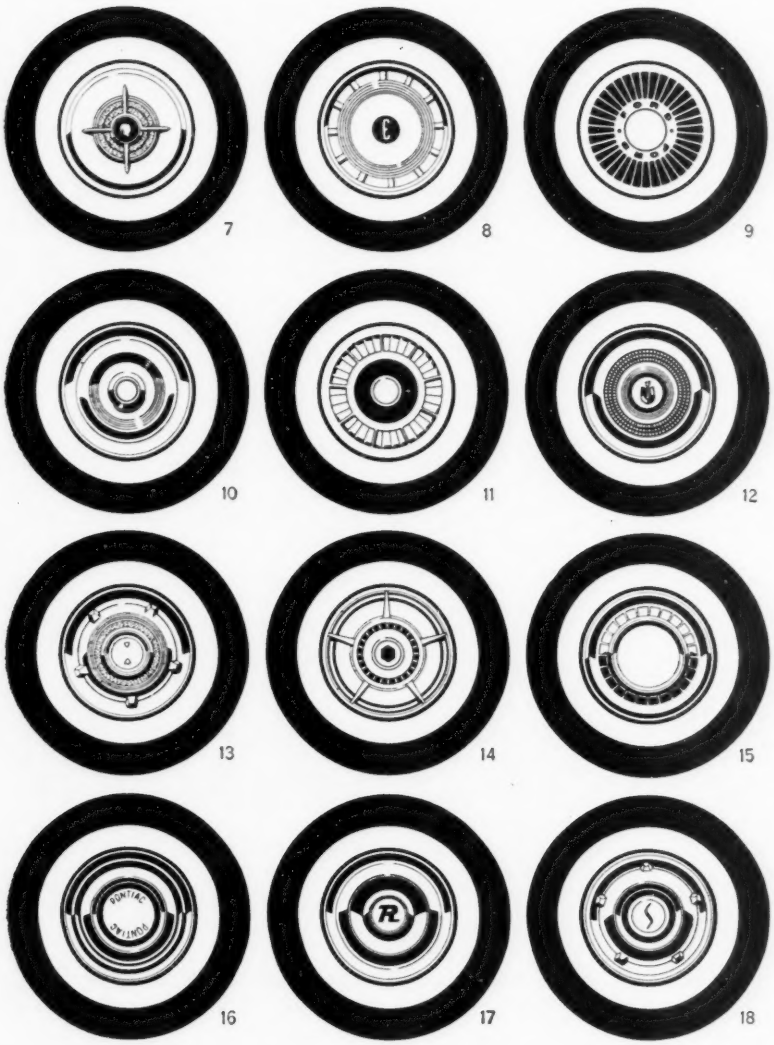
Also, Diamond says its larger and more economic plants at Muscle Shoals, Ala.—a plant purchased from the Army—and at Deer Park, Tex., make the Pine Bluff operation superfluous. Inasmuch as the Texas plant is being expanded, Diamond adds, the company's Southern units can produce chlorine and caustic soda "in the same volume, more efficiently and at lower cost than that possible at Pine Bluff."



How many 1958 cars can you identify by their wheels?

SUCCESS STORY FOR CELLULOSE

All makes of new cars have tires of rayon cord made from cellulose.



With all makes of the 1958 cars having rayon tires as original equipment, it's hard to believe that less than 6% of the tires produced in 1941 used rayon cord. Behind this achievement is a story that will interest any user of cellulose.

When the idea of using rayon in tires was first conceived, Buckeye was enlisted in the original research program. Our Memphis plant supplied the first cellulose used in rayon cord for tires.

In the years that have followed, rayon tire cord has been vastly improved. Since 1950, for example, its flexing quality has increased 60%; its strength more than 50%. A recent rayon cord development gives tires up to 26% more tread life than a more expensive type cord.

Refinements in rayon tire cord have called for higher and higher qualities of Buckeye Cellulose in steadily increasing quantities. Many other products using cellulose also benefit from Buckeye research and customer service. We are ready to serve you . . . just call on us.

BUCKEYE CELLULOSE CORPORATION
Memphis, Tenn.—Foley, Fla.

Buckeye
first in cellulose

WHEEL IDENTIFICATION: 1-Buick, 2-Cadillac, 3-Chevrolet, 4-Chrysler, 5-Continental, 6-DeSoto, 7-Dodge, 8-Edsel, 9-Ford, 10-Imperial, 11-Lincoln, 12-Mercury, 13-Oldsmobile, 14-Packard, 15-Plymouth, 16-Pontiac, 17-Rambler, 18-Studebaker.

COMPANIES

Wyandotte Chemicals Corp. (Wyandotte, Mich.) is planning several bank loans to complete the two new plants and dock facilities now under construction at Geismar, La. Up to now, these projects—whose over-all cost is expected to be more than $35 million—have been financed out of cash flow. Company President Robert Semple says both earnings and sales were at all-time peaks in '57; sales were up 7%, to $85 million, and operating net profit was up 8%, to $4.8 million. In addition, the company realized a $2-million nonrecurring profit on sale of limestone quarries and equipment.

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H. K. Porter Co. (Pittsburgh) has acquired nearly 40% interest in Thermoid Co. (Trenton, N.J.), having bought about 253,000 shares from Graham-Paige Corp and an additional 82,000 shares on the open market. Porter's chairman, T. M. Evans, says that upon completion of Thermoid's annual audit, Porter management plans "to make a proposal to other Thermoid stockholders."

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Du Pont Co. of Canada (1956) Ltd. (Montreal) reports that higher costs relating to new plants resulted in a more than 10% drop in net income last year, even though sales rose 9%, to a record $72.6 million. Net income of $4.5 million (subject to audit) was equivalent to 60¢/common share, compared with 67¢ in '56. Plant construction expenditures during '57: $14.7 million.

•

National Cylinder Gas Co. (New York) has formed four new divisions and a new foreign subsidiary in a major realignment of the company's corporate structure. Certain chemical activities are consolidated into the new Chemical Products Division: Girdler Construction Division will design and build processing plants for chemical, petroleum and other industries; NCG Division will produce compressed gases, plus industrial and medical equipment; and Girdler Process Equipment Division will make heat-exchange equipment and high-frequency dielectric heating equipment. NCG International will operate the Company's gas-producing business in Canada, Venezuela, Colombia and other countries.

EXPANSION

Glass Fiber: Increased capacity for production of glass-fiber materials is in store for California and has been attained in Kentucky.

- In Corona, Calif., L.O.F. Glass Fibers Co. (Toledo, O.) is building a $1-million-plus plant to manufacture, fabricate and warehouse the company's complete line of insulation products. Completion date: Aug. 1.
- At Louisville, Ky., Famco, Inc., has expanded its facilities to 174,500 sq. ft. Much of the expansion was in the spinning room, where installation of additional furnaces and machines more than tripled capacity.

•

Pharmaceuticals: Schering Corp. (Bloomfield, N. J.) has paid $200,000 for more than 500 acres near Tampa, Fla. The site is for possible expansion, but there are no definite construction plans at present. The acreage extends to an arm of Tampa Bay, has a fresh water supply of up to 1.2 million gal./day.

•

Hydrocarbons: Arkansas Louisiana Chemical Corp. —newly organized subsidiary of Arkansas Louisiana Gas Co. (Shreveport, La.)—will build a $3-million extraction plant near Magnolia, Ark.

•

Silicon: Merck & Co. (Rahway, N.J.) has awarded to Wigton-Abbott Corp. (Plainfield, N.J.) a contract to design and construct a $1.5-million unit at Merck's Cherokee plant in Danville, Pa. This will be part of Merck's $5-million project for expanded production of ultrapure silicon for the electronics industries.

FOREIGN

Petrochemicals/Venezuela: The new government in Venezuela is reported to be dubious about the economic soundness of certain petrochemical plants and steel mills now under construction in that country. However, it may permit some of them to be completed, possibly on a smaller scale. In general, oil refineries continued to operate throughout the recent rioting that led to the ouster of the Marcos Perez Jiminez regime.

•

Aluminum/Surinam: Aluminum Co. of America will build a bauxite refinery, aluminum smelter and hydroelectric project in Surinam, on the north coast of South America. Initially, over-all cost is estimated at $150 million; but the project ultimately might be expanded considerably. Capacity of the smelter will be 60,000 tons/year. After 75 years, the dam, 150,000-kw. power house and transmission line will be turned over to the Surinam government.

•

Chemicals/Mexico: American Smelting and Refining Co. (New York) has formed a new subsidiary, Enthone de Mexico S.A., to produce and sell a broad line of special chemicals for Mexican metal finishers. The new company—to be headquartered in Mexico City—will also supply metal-finishing equipment.

•

Chemicals/India: Imperial Chemical Industries (London) will invest at least $25 million in new chemical plants in India over the next 15 months, thus doubling ICI's holdings in that nation. New projects include an explosives plant at Gomia, as a joint venture with the Indian government; a vat dyestuffs plant at Bulsar, and an alkali plant at Rishra, in partnership with two private-capital companies.

Robert (Bob) Heekin, at right, president of Heekin Incorporated, Cincinnati, Ohio, makers of well-known HEEKIN'S HAPPY FAMILY BAKING POWDER, reminisces with C. J. (Jack) Farcasin, Wyandotte representative. Heekin has been a user of Wyandotte Bicarb for many years, and a manufacturer of baking powder for some 74 years.

"We've bought Wyandotte Bicarb since 1905"

Heekin and Wyandotte Chemicals are fine old names in Cincinnati and the surrounding territory:

Heekin . . . because members of the Heekin family have been well and favorably known in Cincinnati since *1869;* and Wyandotte . . . as a supplier of bicarb to Heekin since *1905.*

As merchants . . . as citizens . . . as public servants . . . as business leaders, the name Heekin is deeply etched in Cincinnati's history, and closely identified with its present progress. As a fine baking powder, HEEKIN'S HAPPY FAMILY BAKING POWDER has been a favorite for more than half a century.

"To win and hold baking powder business, you have to achieve and maintain high quality," says Bob Heekin, president. "That means the best of ingredients — all ways. Bicarb is one of these important ingredients. We use Wyandotte Bicarb in all our baking powder. In fact, we have used it for 52 years. It's always uniform.

"Wyandotte is a name that we are proud to have associated with ours. It stands for quality and proved dependability."

Wyandotte U.S.P. Bicarbonate of Soda ranges in grades from powdered to coarse granular . . . has uniform particle size within each grade. Wyandotte Bicarb is free-flowing, blends easily, and has good compressibility.

But whether you use Wyandotte Bicarb or any other Wyandotte product, there are two things to remember: Wyandotte is a good company to do business with, and Wyandotte products are consistently uniform. This means you can always count on Wyandotte. All you have to do is call our representative, and he'll do the rest. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Offices in principal cities.*

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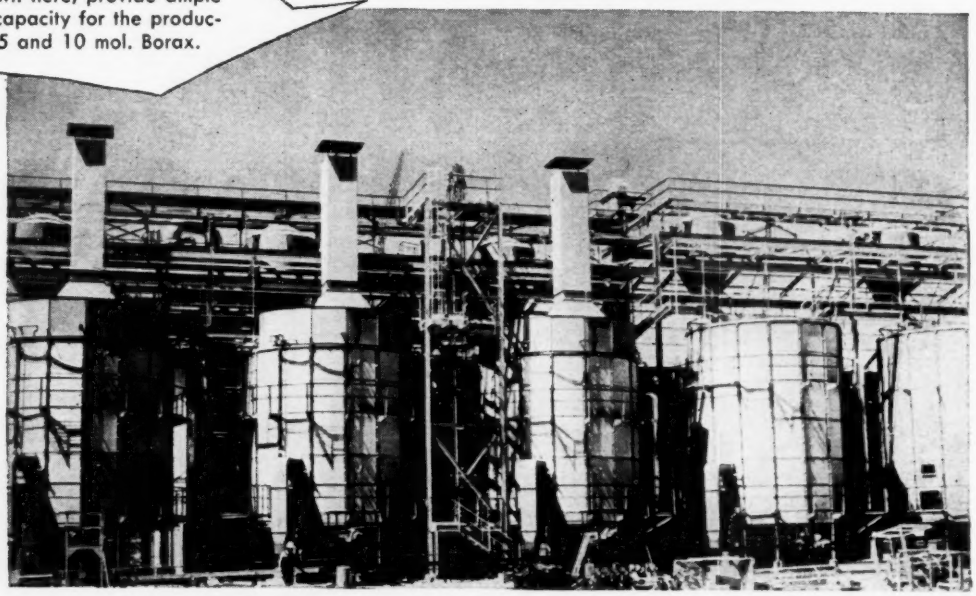

The TURBO-DRYERS'® close temperature control, uniform drying time, practically dust-free operation and low heat and power consumption make them the choice of engineers faced with the problem of meeting difficult and exact product specifications. Such added features as intermittent blending and negligible attrition often narrow the choice to a TURBO-DRYER® for quality drying of sensitive and fragile products. Investigate also the advantages of WYSSMONT **Turbo-Dryer-Coolers,** and **Closed Circuit Systems** for safe **continuous drying** in inert atmosphere, **continuous desolventizing** with solvent recovery, **continuous purification** by entrainer sublimation, **continuous solid gas reaction** and **drying with superheated vapors.** Write for particular bulletin.

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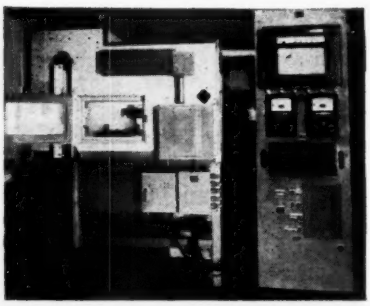

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Washington
Newsletter

CHEMICAL WEEK
February 8, 1958

The White House faces a tough fight over reciprocal trade legislation it sent to Congress last week. In a special accompanying message, the President was unusually blunt in telling Congress that his request for a five-year renewal "must be enacted." He argued that the law is essential to meet the Soviet economic challenge, as well as to protect U.S. economy and strengthen its allies.

But Eisenhower couldn't find a Republican sponsor for the legislation until the last minute. Then Rep. Robert Kean (R., N.J.), who introduced the last trade bill extension three years ago, fell into line. For a time, House Ways & Means Committee Chairman Wilbur Mills (D., Ark.) was considering introducing a stronger bill along with the White House version. Last week, he decided to co-sponsor the Administration bill.

The compromise effort isn't satisfying anybody. Opponents of the Administration bill will push for amendments to reduce—or even remove—the President's power to cut tariffs. Another goal: to make tariff boosts easier for domestic producers to get. Failing that, protection-minded factions say they have the votes either to get specific commodity quotas written into the bill (for chemicals, metals, textiles, etc.), or to kill the bill entirely.

"Reciprocal traders" aren't happy either. They say the Administration bill doesn't go far enough, and that the five-year request is the only "bargaining point" they can use as a position from which to negotiate a compromise.

The Administration bill follows earlier White House outlines. It calls for authority to cut tariffs up to 5%/year for five years, or use the whole 25% reduction authority over shorter periods of three or four years. It also would permit continued lowering of *ad valorem* duties to 50% of the value of the imported item, and grant new power to cut smaller *ad valorem* rates by as much as 3%.

The White House bill also asks new permission to raise tariffs as much as 50% above the 1934 schedules, instead of the lower 1945 rates. And, where a peril point has been established for a domestic product, escape-clause proceedings would be made easier.

•

A shift in stockpiling policy was urged by the Office of Defense Mobilization's Citizens Advisory Committee headed by Chicago banker Holman Pettibone. In its report, the group said the government should stop buying raw materials such as metals and minerals, turn now to finished items and so-called "survival" supplies. What the committee has in mind are food and medicines, construction and transportation equipment to help pull through a possible nuclear attack.

The report also asked a coordinated planning of survival pro-

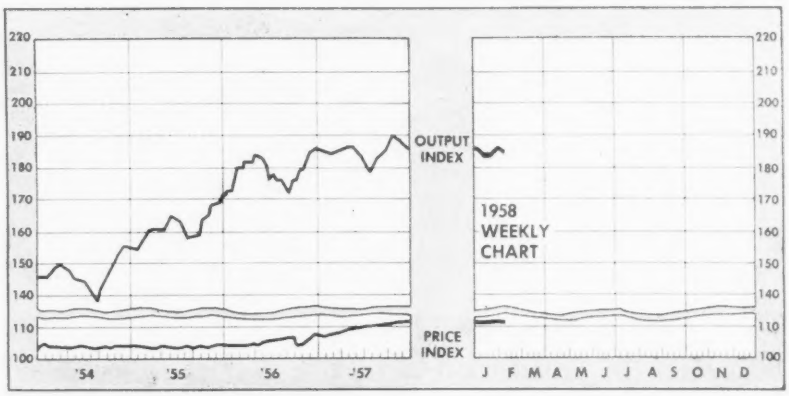
grams by the military and civil defense agencies, and greater flexibility to buy what is needed and sell what is not. But it advised against disposing of raw material stocks because of obvious economic effects on the current soft market.

•

The political fight over TVA's new board appointments is about settled. Senate Democratic opposition to the nomination of Arnold Jones is dwindling in the face of Jones' own campaigning in the valley area. He has convinced critics that he's not out to cripple TVA. Frank Welch, the other nominee, is a strong TVA supporter. The Senate is expected to confirm appointments of both men sometime this month. They have been serving recess terms. (*See also p. 75*).

•

A plan for translating Russian journals has been worked out by the Administration. It calls for Commerce Dept.'s Office of Technical Services to act as a clearing house, with a $1.2-million requested budget for fiscal year 1959 to turn out some 60,000 articles and abstracts. In addition, Commerce is asking $300,000 to get the program under way before **July 1**.



Business Indicators

WEEKLY	Latest Week	Preceding Week	Year Ago
Chemical Week output index (1947-49=100)	185.0	185.5	185.5
Chemical Week wholesale price index (1947=100)	110.9	111.1	108.2
Stock price index of 11 chemical companies (Standard & Poor's Corp.)	40.97	40.39	41.96

MONTHLY **Wholesale Prices (Index 1947-1949=100)**	Latest Month	Preceding Month	Year Ago
All commodities (other than farm and foods)	126.0	125.9	125.2
Chemicals and allied products	110.5	110.3	108.7
Industrial chemicals	123.9	123.6	123.5

AMMONIA

By the Push-button Process

Ammonia plant start-up operations are virtually a matter of "push-button" routine with Chemico; for Chemico has designed and constructed more than 50 ammonia plants in the last 40 years.

While new-comers to the field are constantly running into costly difficulties and delays with unreliable and even untried processes, Chemico designed plants are profitably producing an estimated 25% of the world's synthetic ammonia. Investors in the chemical industries may be interested to learn that despite the proven performance and countless advantages of Chemico's ammonia processes, it frequently costs less to build a Chemico Plant.

Write today for Chemico Bulletin #357 which lists the alternate feed stocks and methods for gas purification and production in the making of ammonia.

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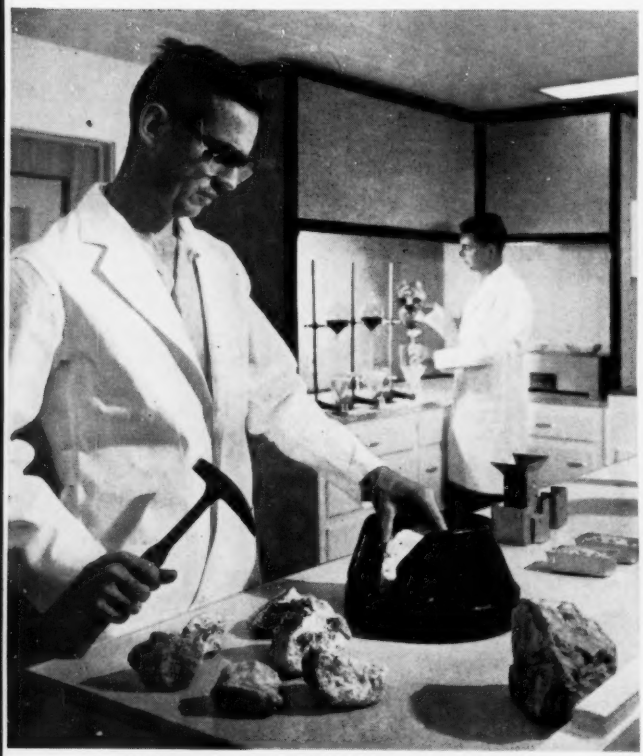
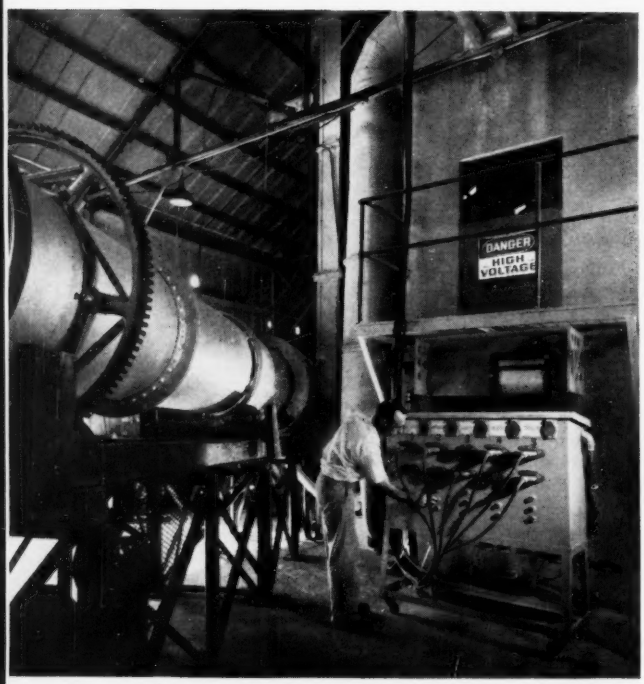
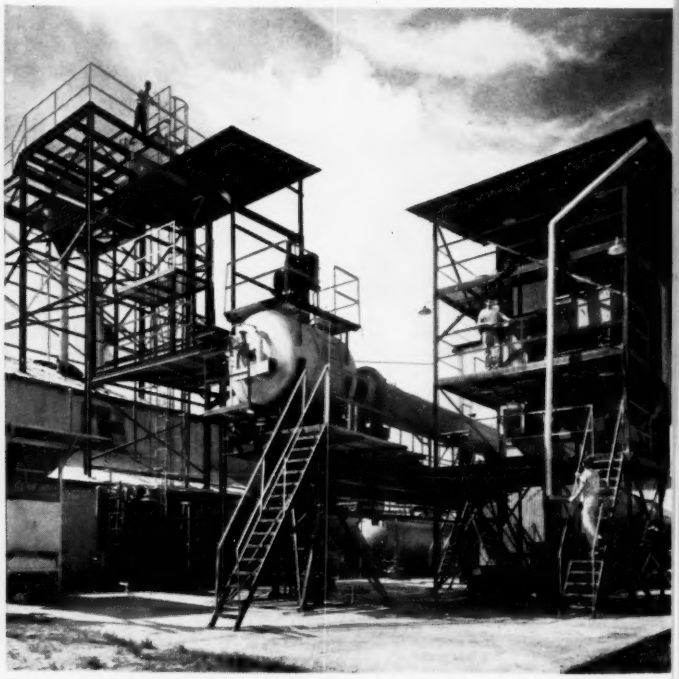
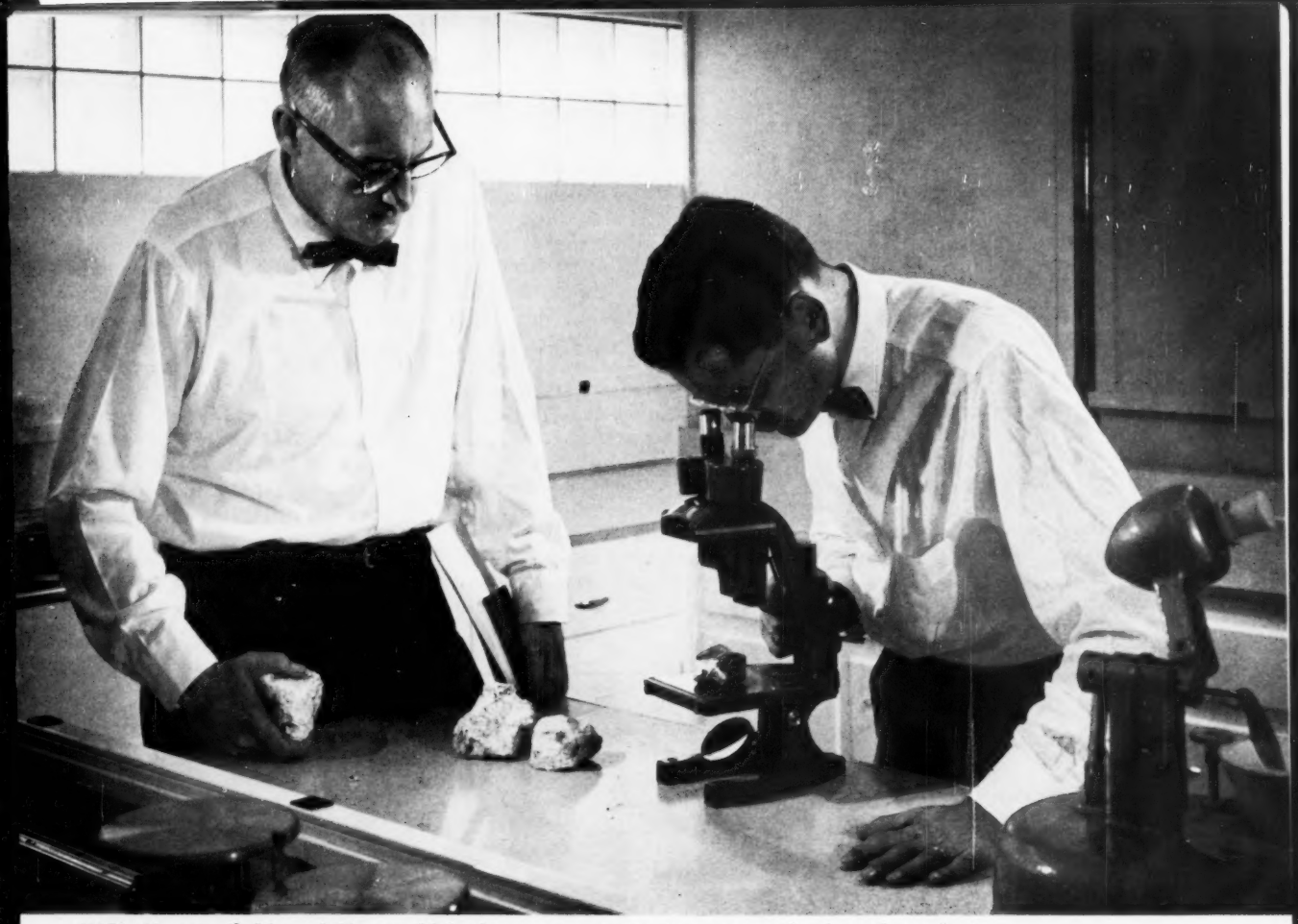


Mineralogical lab technicians explore ore's commercial potential, chart likely routes to new products.





Indoor and outdoor pilot plants work 24 hours a day to turn lab findings into facts for management.



IMC's Kruger (left) and Murowchick chart new routes to processed mineral products.

Seeking New Profit in Minerals Processing

A raft of new information for its far-flung minerals processing operations is now rolling out of International Minerals & Chemical Corp.'s recently opened Florida mineralogical laboratory. Part of the company's Mulberry experimental research station, the unusual new unit supplements not only its research activities but also its process development and commercial production.

A diversified team of specialists is developing the multifunctional data. Without these results, say IMC, a company cannot take full advantage of the opportunities that are afforded by the new mineral raw materials.

The new group, headed by B. L. Murowchick, is expected to be a valuable addition to the large research team that IMC has established in Florida (*CW, May 29, '54, p. 62*). The function of the mineralogical lab, says IMC Vice-President I. M. LeBaron, is to have facts ready when management needs them. To this end, he adds, it's geared to provide swift, accurate appraisal of present products and processes, and to investigate the potential of new ones.

The new laboratory is equipped with analytical instruments and techniques that, IMC says, are unique in the industry and possibly in the country. By such techniques as differential thermal analysis, X-ray diffraction and spectography, it probes into every phase of minerals investigation—from the physical and chemical make-up of the ores to the economics of mining and processing them.

At today's high cost of operations, the correctness of management decisions becomes more and more critical. And the more a processor knows about the complexities of ore processing, the better are his chances of making the most profitable decision.

Exploration and Control: The new facility is of major importance to IMC's search for new products derived from ores and minerals. At the same time, it provides technical and quality control of the company's current processing operations. The laboratory currently devotes about 25% of its work to existing products and processes, 75% to investigations of new materials, including studies of approximately 80 ore samples each month.

One of the other benefits that IMC hopes to derive from its mineralogical lab is a closer tie-in with the company's mining and exploration department. The latter group, organized just one year ago, is directed by Frederick Kruger. Its job: to investigate promising new ores. By analyzing and evaluating new ores quickly and accurately, the mineralogical lab enables the exploration group to concentrate

on the materials that have the greatest commercial potentials.

To speed the development of new products and processes, the mineralogical lab also works closely with the station's pilot-plant testing group. The 15 pilot and subpilot plants at Mulberry are flexible enough to permit duplication of most of IMC's commercial production facilities. The pilot plant is equipped to process material at the rate of 500 lbs./hour for studies involved in plant design, at a 100-tons/hour rate for investigations of continuous operations. Result: top management planners can base their decisions on proved, large-scale operating data.

Revamped Operations: In addition to its leading role in commercial research and development of new products, the mineralogical laboratory also plays an important supporting role in upgrading some of the company's older products and processing techniques. A major process revamp at the Industrial Minerals Division's Topsham, Me., plant is a good example:

The Topsham plant produces a grade of feldspar used in the manufacture of glass and ceramics. While casting about for other markets for this, IMC received encouragement from porcelain insulator manufacturers—provided the feldspar could be supplied to their specifications. The ore contains 75% feldspar, 25% free quartz and has a desirable alkali ratio of potash to soda. But porcelain insulators required a higher feldspar content, improvement of the favorable potash-to-soda ratio.

Mineral specialists at the Mulberry station were asked to determine: (1) whether or not the required product could be made at the Topsham plant; (2) if so, how it could be produced most economically.

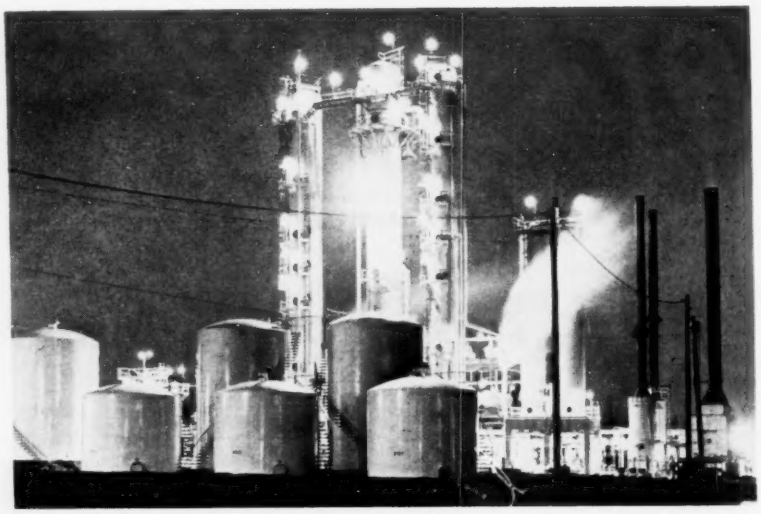
Analytical studies conducted at the mineralogical laboratory confirmed that it would be relatively simple to extract all but 5% of the free quartz. The lab determined the size to which the ore would have to be crushed to do this extraction.

Next, the mineral concentration group tackled the job of developing an economically feasible technique for upgrading the Topsham plant's product. Batch tests gave the answer: the LeBaron-Lawver process, which employs an electrostatic separator. This process involves pretreating the material in such a way that one component becomes positively charged, while a negative charge is induced in the other. The crushed ore is then allowed to free-fall through a field between two charged electrodes. The charged particles are distributed according to a measurable pattern.

Based on the findings of repeated test runs, a pilot plant was designed to process feldspar ore at the rate of 200 lbs./hour. Piloting verified that desired results could be produced consistently under full-scale commercial conditions, aided design of the actual installation at the Topsham plant. In addition, the findings demonstrated effectively how other feldspar ores of interest to IMC might be upgraded economically.

Again, the mineralogical laboratory helped the Topsham plant to break a bottleneck in quality control of its routine processing operations. To insure that feldspar met high potash-to-soda specifications, the plant formerly sent samples to Kona, N.C., for chemical analysis in the plant lab there. But this method of quality control necessitated holding finished material for three to four days before it could be released for shipment.

Specialists in the Florida lab devised a better quality-control check—a geiger counter, installed right in the process line. It makes analysis in a matter of seconds without interrupting product flow. The new system not only eliminates shipping delays but also enables plant operators to spot and



Benzene Heads New Product List

With the completion of its new 30-million-gal./year benzene plant at Baytown, Tex., Humble Oil & Refining Co. has taken another big step toward its goal of expanded petrochemical operations. One of the largest Udex refining units in the world, the plant is the first built in a 40-acre tract set aside by the company as a chemical products area. Plans are too indefinite at this time, says Humble, to say much about additional units that may be located in the area. However, the site is planned in a way that will eventually accommodate about 16 processing units.

Built by Badger Manufacturing Co. (Cambridge, Mass.), the Udex benzene unit was originally designed to produce 24 million gal./year, was later boosted to the 30-million-gal./-year capacity.

The unit has been integrated with other refinery operations, takes its feedstock from a nearby Hydroformer. Humble feels that long-range requirements for high-purity benzene will continue to grow. Output from this plant will be sold in the Gulf Coast area where it's used for the production of styrene, plastics, resins, detergents and insecticides.

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Specifically: one processor had been performing his own turnaround service—using mechanical methods—at an annual cost of $315,000. The Dowell Service Engineer and his team performed the same service in 1/10 of the time at a cost of $2300. The savings in downtime alone amounted to $210,000.

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Virginia's highways of 1958 form a modern 49,000-mile network to serve your plant. Over them, the South's conservative, home-rooted manpower reaches your parking lot. And along the State's heavy-duty highways, truck lines complement railroads to bring you Virginia raw materials from mine, forest, farm and fishery . . . or speed your finished products overnight to great markets of the Northeast, South and Midwest.

Along Virginia highways you will find almost any combination of advantages your new plant needs. Ample industrial water. Abundant electric power. Coal and natural gas. For site-finding help in this land of mild climate, thrifty government, and pleasant living . . . write, phone or telegraph in confidence

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correct troubles before large quantities of material get through the process.

Speed and Accuracy: Scientific advances are coming so fast, says LeBaron, that it is difficult to keep up with the new opportunities and markets that progress creates. Under such changing conditions, management faces frequent crucial decisions for which the decisive facts are sometimes wanting.

The mineralogical laboratory's flexibility and its ability to provide swift, accurate analyses is designed to supply these missing data.

PROCESSES

Fuel from Silt: Waste-water silt from the German coal industry will be processed to dust coal (heat capacity: 4,000 kcal.) and blast-furnace coke. Emscher Genossenschaft, an association of Ruhr district communities primarily formed to fight water pollution, will do the job in a new plant near Duisburg, due onstream this spring. Admittedly a high-cost project, it is aimed at cutting the present high cost of transporting and storing the 5 million cubic meters of silt produced each year. At least one American coal producer (Philadelphia & Reading Corp.) is known to be actively pursuing silt reclamation, in this case by gasification (*CW, Feb. 23, '57, p. 70*).

•

Nuclear Power: A method for direct conversion of nuclear heat to electricity by thermocouples is described in a recent German preliminary patent application (DAS 1,021,962) assigned to Siemens-Schuckertwerke (Erlangen).

•

Automatic Kilning: Calaveras Cement Co. reports successful operation of a completely automatic system of kiln operation at its San Andreas, Calif., plant. The temperature of the mix in the calcining zone of the kiln is measured directly for the first time, says the company, and fuel and air flows are adjusted automatically. The new system is said to result in greatly improved process control and product uniformity. The older method required the operator to estimate the calcining temperature, then manually adjust the fuel and air flows.

•

Neoprene Curing: The Du Pont LCM Method is a new process developed by Du Pont's Elastomer Chemicals Dept. for continuously vulcaniz-

ing extruded neoprene shapes. Already in commercial use, the method involves passing the extruded material directly into a bath of molten metal or an organic fluid at 400-600 F. Full vulcanization takes place in 20-30 seconds. Advantages claimed: lower manufacturing costs, improved surface appearance and tolerance control.

•

German Fusion: In the wake of last week's disclosures of British and U.S. progress with thermonuclear fusion (*CW, Feb. 1, p. 20*) a group of German nuclear physicists reports that it has achieved a current of 1 million amperes in its fusion experiments at Aachen Technical University. The million-ampere pulse, however, was sustained for only about 1 microsecond, produced a temperature of only 200,000 C. British and U.S. tests, by contrast, have produced temperatures of 5 to 6 million C with pulsed currents of up to 200,000 amperes.

•

British Cumene: British Hydrocarbon Chemicals Ltd. will employ Scientific Design Co.'s cumene process at Grangemouth, England. The British firm has been licensed by Mid-Century Corp., a subsidiary of Standard Oil of Indiana, which last year acquired worldwide rights to the process. Due onstream in mid-'59, the Grangemouth installation will be the third cumene plant engineered by SD. The cumene will be used in the manufacture of phenol and acetone at the same plant.

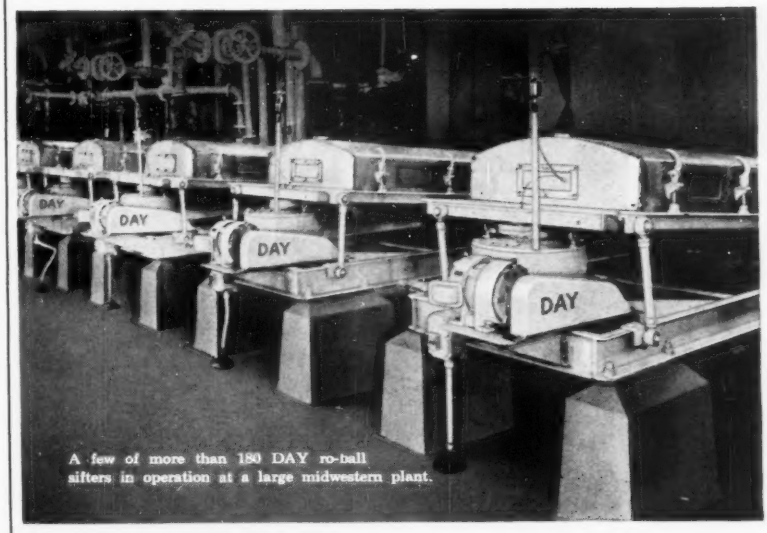
•

Oil from Coal: South African Coal, Oil and Gas Corp. reports that its synthetic oil-from-coal plant has averaged only 30-35% of its rated 200,000-tons/year capacity since the start-up of operations in '55. Persistent holdups in the American-designed section of the synthesis unit, which comprises over two-thirds of the total capacity, are blamed. Operating deficit in the year ended last June was $11 million including $4.7 million for depreciation.

•

Uranium Separation: Prof. Hans Martin of Kiel University has developed a centrifugal method of separating isotopes of uranium. The technique, coupling thermal-diffusion effects with centrifugal forces developed at 30,000 rpm., is said to achieve degrees of enrichment close to those theoretically obtainable.

SIFT finer-faster-cleaner with DAY ro-balls

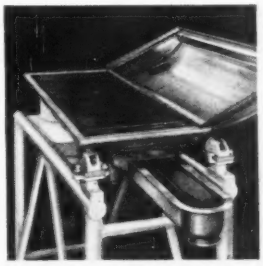


A few of more than 180 DAY ro-ball sifters in operation at a large midwestern plant.

Today thousands of products wet or dry, from flour to wood chips, are sifted through efficient, low-cost, high-production DAY ro-ball sifters. Superbly engineered, built for trouble-free operation under the severest service conditions, they insure longer life with lower maintenance costs.

The exclusive super active ball cleaning device provides rebound points in each ball compartment, assuring fast, thorough sifting of your product. Gyrating action brings material into constant contact with every square inch of screen surface. A stabilizer maintains screen in horizontal position and insures smooth operation.

DAY standard ro-ball, available in six sizes, single or multiple screens. Single screen models in stock.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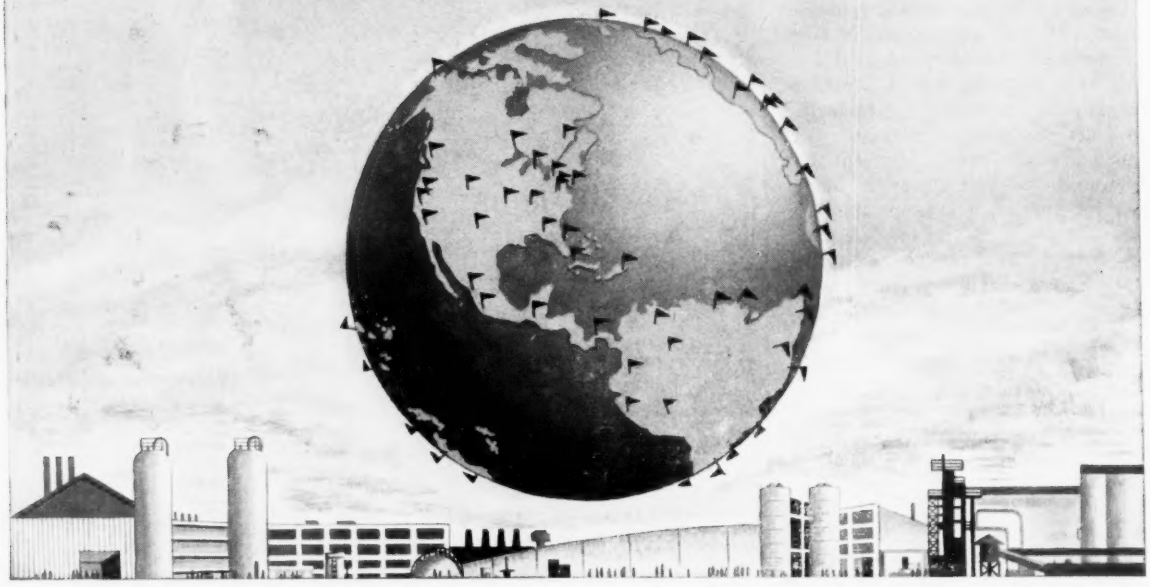

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Nov. '55: Louisiana state entomologist, L. D. Newsome, reports boll weevils resistant to chlorinated hydrocarbons.

Jan. '57: Chlorinated hydrocarbons removed from recommended list. Hercules' P. J. Reno maps counterprogram.

March '57: Farmer T. A. Calloway and eight others try toxaphene and toxaphene-DDT insecticides on their cotton crops.

Sept. '57: Tours of demonstration plots show infestation counts substantially below average, cotton matured earlier than on adjoining, nontreated acreage.

Louisiana's Timetable on Toxaphene Tests

Time: Last week.

Place: Biloxi, Miss.

Characters: Sales management and branch representatives of Hercules Powder Co.'s Agricultural Chemicals Division.

Event: Sales meeting.

Subject: How best to capitalize on a daring public relations gambit.

The gambit came about as a result of the decision by P. J. Reno (*above*), agricultural chemicals division manager, to combat charges that the company's chlorinated hydrocarbon insecticides, toxaphene and toxaphene-DDT were no longer effective against the cotton boll weevil in many parts of Louisiana.

Convinced, by past studies, of the effectiveness of the products, Reno decided to attempt to convince farmers, researchers and state agents in Louisiana that when properly applied toxaphene and toxaphene-DDT would still do the job.

Such a project meant that Hercules and Reno would have to take a great deal of calculated risk. Mismanagement or failure of the gambit would create ill feelings among Louisiana citizens and officials involved, result in loss of prestige for the company.

On the other hand, as Reno and other Hercules executives readily realized, to accept as true the charges against their products would be to admit defeat, result in steadily decreasing sales of insecticides in Louisiana and, subsequently, throughout the cotton belt.

Here's how Reno analyzed Hercules' problem, and how he set about building a public relations program that could solve it.

Trouble in 1955: Trouble for Hercules and other makers of chlorinated hydrocarbon insecticides began in the fall of 1955. Louisiana farmers and entomologists reported that they were unable to control the cotton boll weevil with commonly used insecticides (*see above*). They made similar reports again the following fall.

As a result of these reports, in 1956, all chlorinated hydrocarbon insecticides were restricted by the state. And, in 1957, State Entomologist L.

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D. Newsome ordered such products removed from Louisiana's recommended list of products for boll weevil control over most of the state.

State authorities and many farmers were convinced that weevils had developed an immunity to the chlorinated products and that other poisons such as the phosphorus-based insecticides were necessary to break the immunity.

It was necessary to prove that the chlorinated products did work; and to prove this fully, a large-scale program would be required—a program so extensive that it would be impossible to "bury" if the tests didn't work out favorably for Hercules.

Demonstration Farms: To carry out his plan to show farmers that toxaphene and toxaphene-DDT still were effective, Reno decided in the spring of '57 to conduct actual demonstrations on farms in Louisiana. The demonstrations were to be conducted on a scale large enough to provide not only proof of effectiveness but also evidence of profit that a farmer might gain by using toxaphene and toxaphene-DDT formulations.

Reno and his staff spent considerable time selecting tough demonstration fields. A total of some 1,750 acres were selected on nine farms in localities with significant boll weevil problems. All of the fields had records of severe weevil infestation.

Meantime, Reno figured that his plan should not only vindicate the effectiveness of the chemicals but also provide useful suggestions about when to apply the chemicals, and how much to use. The extra data would make farm writers more interested in the story, too.

Selected were farmers (like T.A. Calloway, *p. 47*) who were interested in a more economical insect control program. In addition, all possessed suitable equipment and expressed a willingness to make applications according to Hercules' suggestions.

Early-Season Control: The over-all problem, according to Reno, indicated a need for an early-season control program. Aim: to reduce overwintering weevils (those that burrow in the ground for the winter, emerging in the spring to feed and breed), control plant bugs and also other cotton-damaging insects.

The program began in April, 1957, as soon as the cotton came up to a stand. Two-pints/acre applications of toxaphene were made at seven-day intervals to control thrips. Following this, four applications of toxaphene (one quart/acre) were made at seven-day intervals to kill other insects.

Late-Season Control: Late-season control for the boll weevil began in most test fields in the early part of July. Timing of the applications was based on the extent of weevil infestation—usually by the time the field was 10% infested. Mixture of 2 lbs. of toxaphene to 1 lb. of DDT was used.

Hercules management felt that it was important to make the applications before infestation passed 10%. Farmers in the area had frequently waited until infestation reached 25% before applying insecticides.

Glowing Success: Without exception, all of the fields involved in the Hercules program matured faster than other fields in the same communities. Observations and records of some of the fields adjoining Hercules' demonstration farms indicated that several of these nonprogram fields (treated with materials recommended by the state in '57) suffered severe damage from boll weevils and bollworms.

To keep check on the progress of the demonstration, Hercules hired two professional cotton scouts to make regular weekly infestation counts of the various insects in the test fields. Complete records were kept and made available to everyone interested in the program, including the local and farm press.

Program Payoff: The program was a complete success (in a season, Hercules spokesmen point out, when weather conditions were highly conducive to a heavy boll weevil infestation). Reno then began capitalizing on the news, contacting not only the local agriculture writers but also those with nationally distributed columns.

By the end of the season, farm columnists and others were reporting that "entomologists may have to adjust their thinking" as a result of the program. Farmers in the test areas are convinced of the effectiveness of the Hercules products, and word is rapidly spreading around the state. Newsome is expected to recommend toxaphene-DDT for all but early-season control.

Present Hercules plans are to follow up this season's success with an even bolder and more extensive demonstration next season.

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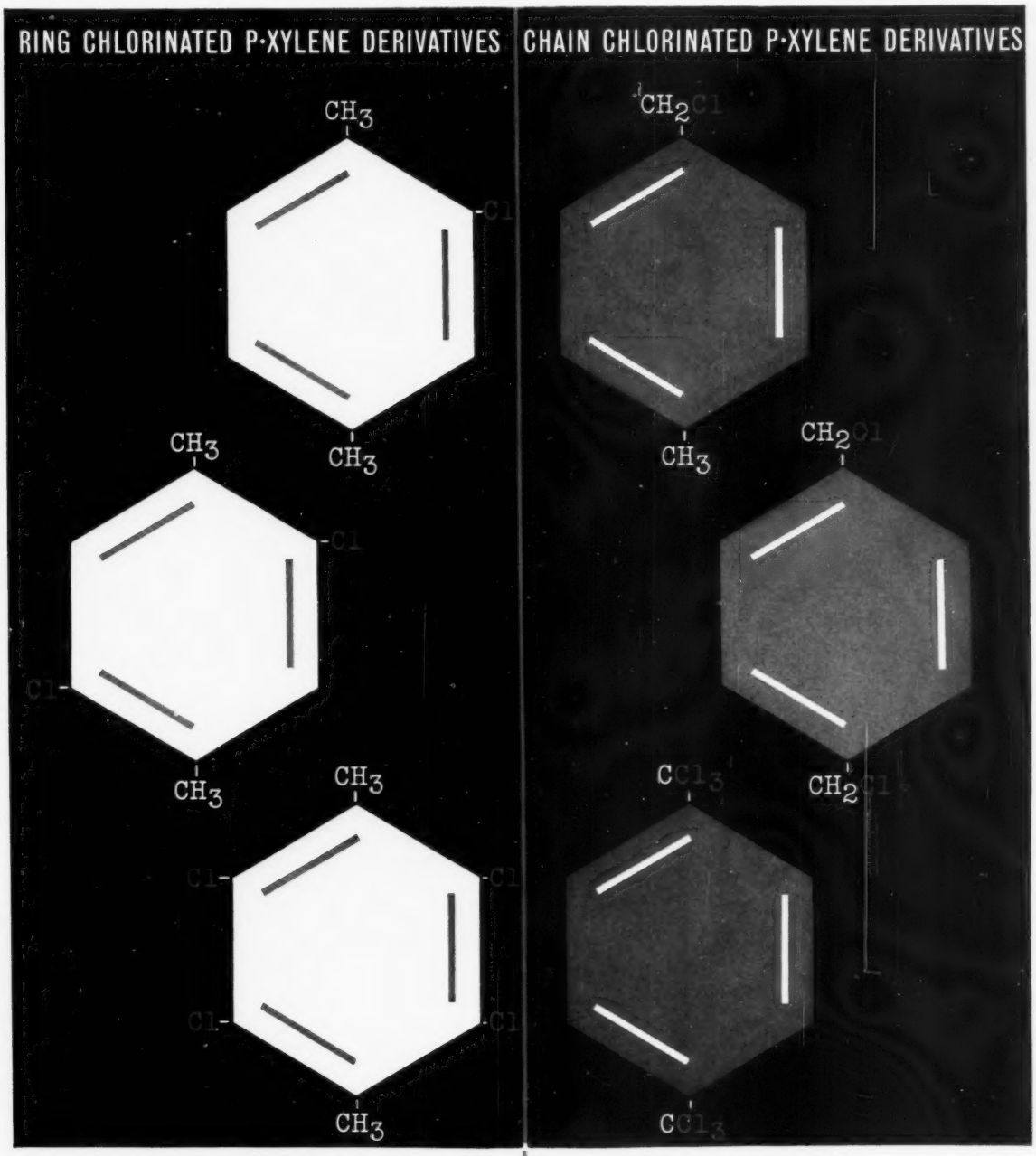

2-chloro-p-xylene (B.P. 186°C)
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Diamond Chemicals

Settlement of strike in British Columbia pulp- and paper-mills could have far-reaching effects.

Will Pulpers Set Canadian Wage Pattern?

Hopes for settling the prolonged strike of 6,000 pulp- and paperworkers in British Columbia were revived last week as new talks between the unions and management got under way. Settlement of the issues may set patterns that will be followed elsewhere in Canadian chemical process industries.

The strike began last Nov. 14 (*CW, Nov, 23, '57, p. 22*) when officials of Pulp, Sulphite and Papermill Workers Union and United Papermakers and Paperworkers couldn't agree with proposals by the representative of the companies, Pulp and Paper Industrial Relations Bureau. The bureau had okayed a 7½% wage boost based on the majority report of a conciliation board's ruling on negotiations. The unions seek 12%.

Though management spokesman D. L. Blair, of the Industrial Relations Bureau, would not comment officially on the new talks, it's believed that he feels some progress is being made. The unions have sought a reopening of negotiations, now infer they would be willing to accept a wage increase somewhere between 7½ and 12%.

At present, the British Columbia paperworkers' basic wage is $1.72 an hour, said to be the highest wage in the industry in Canada. Blair says a 7½% settlement, along with changes in vacation pay, would be the highest known settlement in North America in '57. (A boost higher than 8% would make the Canadian Oil, Chemical and Atomic Workers' avowed goal of 8% modest by comparison.)

Wide Effect: A major point in the unions' argument is that their proposals would bring British Columbia papermaking rates into closer alignment with those of their U.S. counterparts. Considerable pressure has been brought in recent negotiations to close the gap between U.S. and Canadian chemical wages. Thus, should the union be able to achieve its goals, or come close to them, the victory for the 6,000 paperworkers would have sweeping effect elsewhere in Canada.

Blair comments: "It is unfortunate in some ways that the currencies of the two countries are both called dollars, because they are the same in name only. U.S. wage rates are determined in the light of that country's economy, and similarly Canadian wage rates are governed by the Canadian economy—and the two differ greatly."

The unions' argument is that markets for the U.S. and British Columbia papermills are the same and that wages should therefore be comparable.

At any rate, the issue of Canadian-U.S. wage differentials, particularly in plants owned by one company, on both sides of the border, will continue to be a focus of major debate. And, if the paperworkers are successful in minimizing the gap, it may well be that other process industry groups in Canada will reassert their demands.

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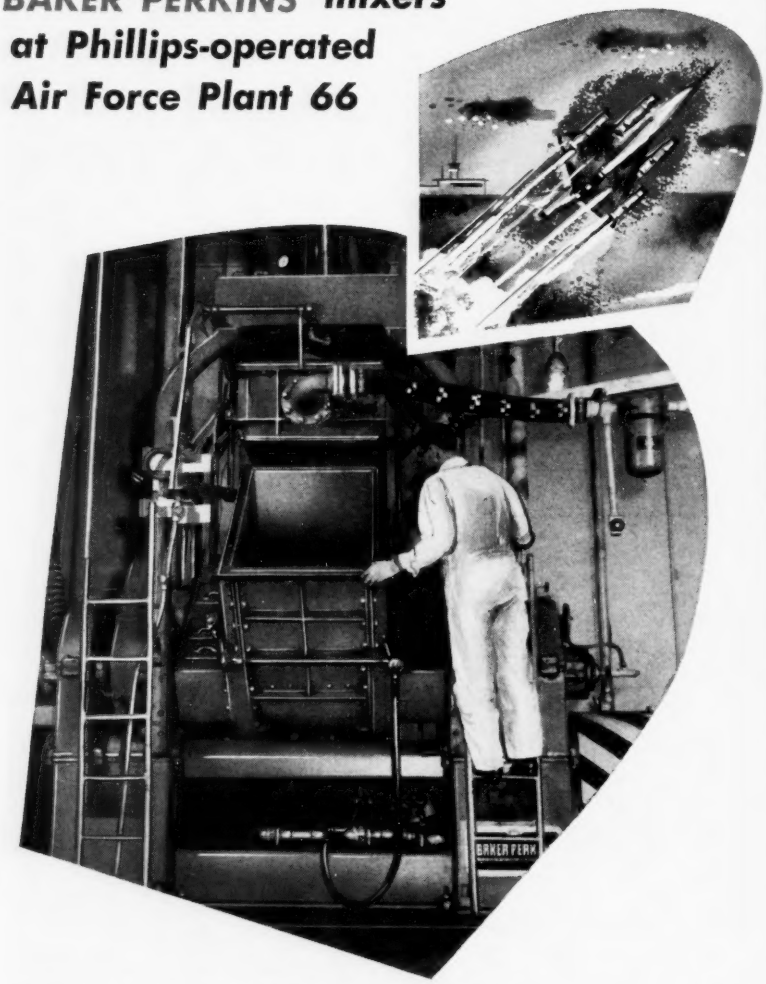

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354

ADMINISTRATION

Pinpointing Pollution

There's a new low-cost tool available to process industry management seeking to assess air pollution problems. Stanford Research Institute has developed a statistical system of measuring pollution, based on area fuel consumption rather than on expensive physical and analytical tests.

SRI's procedure makes use of data on fuel consumption of public and industrial groups to arrive at estimates of the type and quantity of certain pollutants. The system works, says SRI, regardless of the community's size or location. In addition, says SRI, its technique provides a way to calculate air concentration of these components if an area and wind movement are assumed.

The procedure, SRI explains, attempts to ascertain the gaseous and particulate effluents from the daily living of a community. It takes into account those of residential groups, industrial groups and others that discharge pollutants into the atmosphere.

Checkout: SRI has compared results of its computations with analytically determined data from cities that have already run actual pollution analyses. In all cases, the results were extremely close. SRI concludes that its statistical system is as accurate as on-the-spot analyses, and is cheaper besides.

The institute suggests that knowledge gained from such estimates of community air pollution sources will give air pollution workers and the community an indication of where unaccounted-for air contaminants might originate. From that knowledge, confirming experiments can be made and proposals for legislation worked up.

For chemical process management, the measuring system may prove useful in finding the pollution contribution of their plants—a task that would be quite simple in communities with few industrial installations. Again, the estimates provided by the tool could be useful in management's search for potential plant sites.

Research on SRI's measurement method was financed in part by Columbia Empire Industries, a group of industries in the Oregon area. One user of the system is the Robert Taft Sanitary Center in Cincinnati, O. It's also been applied to studies of the Denver, Colo., area.

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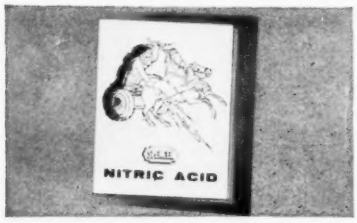

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December 2, 1957

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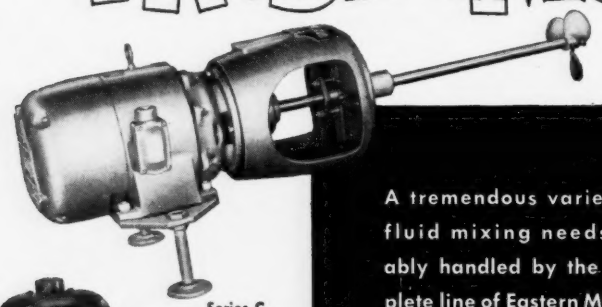

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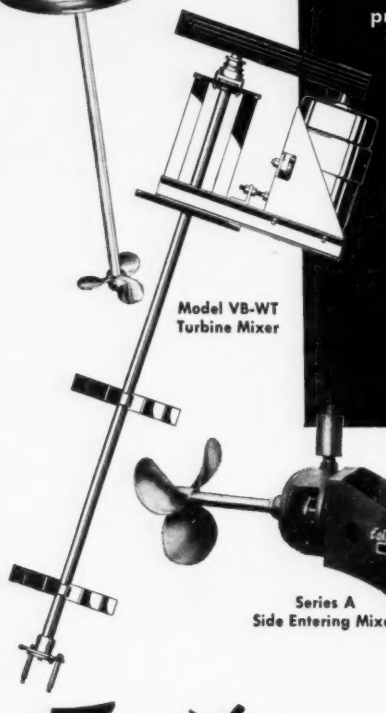

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ADMINISTRATION

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Under terms of the plan, overtime will count toward the 48-week guarantee, as will any time-off for paid holidays, paid vacations, disability, disciplinary action and loss of time because of fire, flood, other catastrophes or governmental action.

Champion employs about 10,000 people, believes the new employment security plan is the first of its kind in the pulp and paper industry.

•

Right to Work: Sponsors of a "right-to-work" movement in California have the go-ahead signal to circulate petitions for the 322,429 signatures needed to qualify the issue for next November's election.

State Attorney General Edmund G. Brown paved the way when he gave the proposed state constitutional amendment a title: Employer-Employee Relations Initiative Constitutional Amendment.

Meantime, the California State Federation of Labor is mapping opposing plans. At special meetings in Los Angeles and San Francisco, officials and delegates from building trades and central labor councils approved an appeal for a $1-per-member contribution to the State Federation of Labor Defense Fund. The federation will campaign against what labor has termed "the heavily financed right-to-work proposal."

•

Engineer's Guild: Another white-collar union is taking formal shape in New York City this week. Leaders of engineering unions representing some 22,000 employees are gathering to adopt the Engineers and Scientists Guild Constitution. Formalization of ESG is the latest step in the drive to consolidate the bargaining aims of technical employees.

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The photograph shows the results and pointedly illustrates the relative inertness of Eastman Polymeric Plasticizer NP-10 on polystyrene surfaces.

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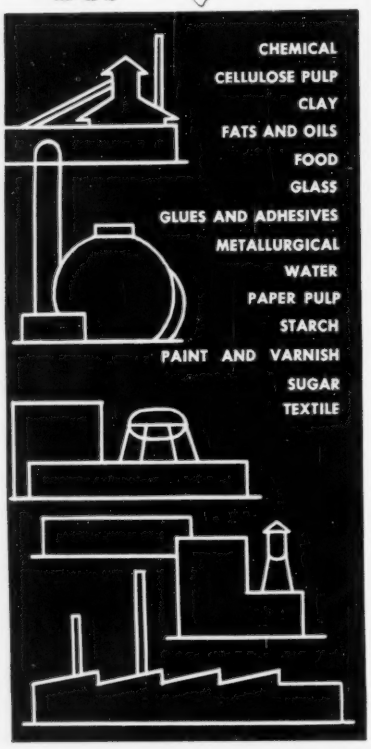

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ADMINISTRATION

Judge Bicks: His decision will delay an accounting in Scotch Tape case.

LEGAL

More on Tape Patent Suit: Judge Alexander Bicks (U.S. district court, New York) last week granted a motion by Technical Tape Corp. to suspend all proceedings in its legal action with Minnesota Mining & Mfg. Co., pending outcome of Technical's appeal to the U.S. Supreme Court.

Technical is appealing a '56 decision that found 3M's Scotch Tape patent (U.S. 2,177,627) valid and infringed by Technical. The patent had been awarded Richard Gurley Drew in '39 and assigned to 3M. It covered pressure-sensitive adhesive tape.

Following the '56 judgment, the court appointed a master to take an accounting of the damage done by infringement. But Technical received a suspension, pending appeal to U.S. court of appeals.

Then, in '57, the court of appeals upheld the decision against Technical, and the master was ordered to proceed with the accounting.

But with the granting of Technical's recent motion, accounting will be further delayed until the Supreme Court has its say. The case was originally brought in '51, when Technical filed a suit against 3M seeking a declaratory judgment. Technical had asked the court to find the Drew patent invalid or, if valid, not infringed.

•

Corporate Liability: Du Pont and Hercules Powder Co. have been named defendants in a $1-million damage suit filed in U.S. district court (New York). The suit may well set a precedent for future liability actions involving corporations and members and employees of the armed services.

The suit—filed by a civilian electronics engineer and a Navy seaman—charges that both were injured July 17, '57, in an explosion allegedly caused by a defective blasting cap manufactured by the companies. The explosion occurred aboard the *USS Somersworth*, 135 miles off Montauk Point, L.I., while the ship was participating in the study of sound propagation caused by explosions in the sea.

Adelbert Littlehale (Groton, Conn.), a civil service, grade G.S. 7, electronic engineer working for the Navy's Sound Laboratory (New London, Conn.), is asking $750,000 damages. He claims he suffered injuries to his head, limbs and body, internal injuries and severe shock to his nervous system. He claims that some of the injuries are of a permanent nature.

Erwin Zelanko (Brooklyn), a seaman aboard the *Somersworth* at the time of the explosion, is asking $250,000 damages. He claims injuries similar to those allegedly suffered by Littlehale.

The complaint states that the explosion occurred due to negligence of Du Pont and Hercules in manufacturing the blasting cap.

•

Contract Action: Unexcelled Chemical Corp., denying all allegations, has just asked for dismissal of a $1,025,000 suit filed against it in U.S. district court (New York) by Mt. Vernon Corp. In addition, Unexcelled filed a counterclaim suit against Mt. Vernon for $75,000 damages.

Mt. Vernon charges that Unexcelled has refused to carry out agreements between the two companies. According to the complaint, Unexcelled agreed to buy from Mt. Vernon certain equipment belonging to Federal Cement Tile Corp., a liquidated concern owned by Mt. Vernon, and that it also agreed to lease for 10 years buildings and land belonging to the liquidated company.

Unexcelled, in its countersuit, claims that Mt. Vernon made false representations that caused it to cancel the agreements, and that it was damaged to the extent of $75,000 by relying on the representations.

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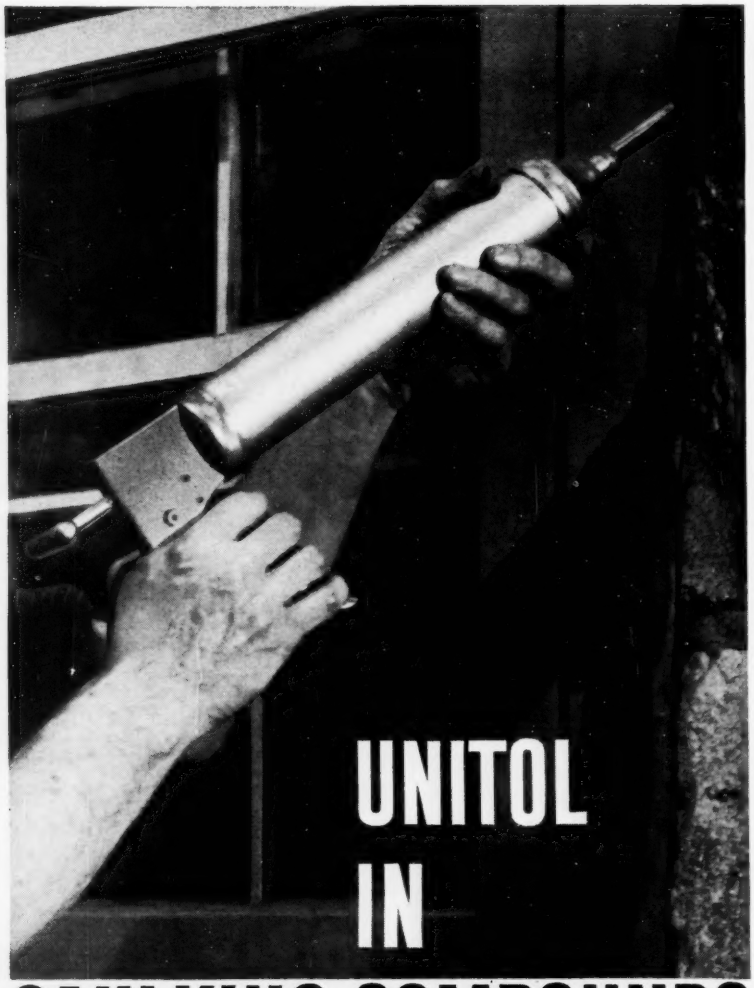

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KEY CHANGES

Harold W. Fleming, to director of research, Catalysts and Chemicals Inc. (Louisville, Ky.).

George C. Shannon, to director; and **C. D. Smith,** to vice-president and managing director; Parks, Davis & Co., Ltd. (Montreal, Que.).

William G. Fallon, to director, vice-president, member of executive board, Norton Co. (Worcester, Mass.).

Irb. H. Fooshee, to president and director; and **Vincent W. Suellau,** to director; Nichols Chemical Co., Ltd. (Montreal, Que.), Canadian affiliate of Allied Chemical & Dye Corp. (New York).

R. J. Drews, to vice-president—staff administration; and **B. K. Henry,** to controller; Rexall Drug Co.

Thomas P. Moran, to vice-president, National Chemical & Mfg. Co. (Chicago).

Howard M. Packard, to president and chief operating officer, S. C. Johnson & Son (Racine, Wis.).

Charles H. Braithwaite, to director of research and development, Productol Co. (Santa Fe Springs, Calif.).

Glenn P. Roddey, to general manager and vice-president, Rozilda Laboratories (Long Island City, N.Y.), manufacturer of surface-active agents and organic chemicals.

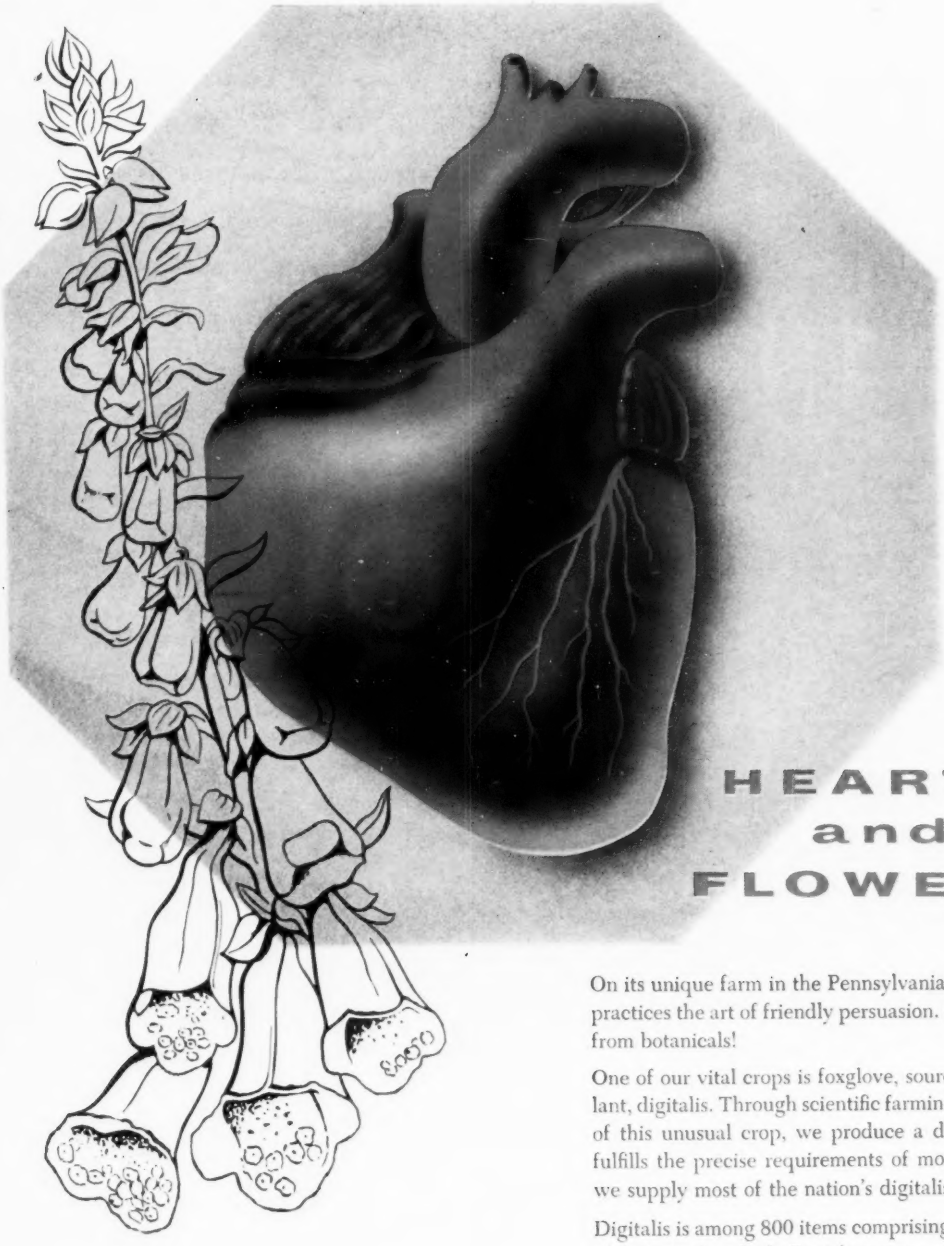
John L. Woolley, to director of sales; **Russell W. Thatcher,** to administrative assistant to the president; and **Jack W. Sugden,** to vice-president and director of marketing; B. T. Babbitt (New York).

Allan R. A. Beeber, to vice-president for research and development, Arkwright Finishing Co. (Friskeville, R.I.).

Audley Clarke, to vice-president, Chemical Products Corp. (East Providence, R.I.).

KUDOS

To **Fred J. Emmerich,** past board chairman, Allied Chemical & Dye Corp., the Chemical Industry Medal for 1958, American Section of the Society of Chemical Industry.



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Carmody Corp. executives study miniature mockup of control panel it will scale up as a trainer.

Control-Panel Trainer Slices Startup Time

As it settles down comfortably in its new, larger home this week, the Carmody Corp. (Buffalo) is starting a sales drive for chemical process company customers. Its campaign is based on an intriguing proposition: "Let us train operators for the new plant you are building, and before it's finished we'll give you a trained crew that may save 20% or more of your normal startup time."

The firm has already made a name for itself in the military training field, particularly in aviation. It's now eager to cash in on this experience by serving the process industry as well. And it has done enough work with large companies—like Du Pont and Standard Oil of Ohio—to be convinced that it has something to offer.

Knowledge Does It: Edmund Carmody, graying-but-youthful president of the firm, has built his business around the established "learn-by-doing" principle.

"The biggest obstacle to efficient operation," he says, "is fear. We simply replace this fear with knowledge." He explains that it matters little whether this fear involves flying a complicated airplane or operating an intricate series of chemical processes.

The catch to putting this learning-by-doing principle into operation, of course, is that it may be expensive letting a trainee gain his experience by operating a plant. So Carmody Corp. sets out to reproduce operating conditions under what it calls "optimal, nonemotional conditions." It does this through the use of such devices as simulated control panels.

Model Control Room: It has already done this sort of job in three projects with Du Pont. Working with that firm's engineers, Carmody Corp. has simulated the control panel of a new plant. It has buttons, lights, horns, indicators and recorders, including movable pens for each instrument.

In the training program, the instructor explains the process and its operation to the class, shows how the controls and gauges on the panel affect

*Left to right: Arnold Krueger, Robert Pollock, Edmund Carmody, Frank Salisbury, William Lybrand.

and record the operation. He then sets up a series of conditions on the panel dials and asks the class what steps should be taken.

"This," says Carmody, "is the 'learning feedback,' the important part wherein you find out just how much the man has absorbed from the instruction."

The panel has been built in three sections, each dealing with a complete step in the process. As each step is taught, a series of interlocks are hooked up to give some automatic response from the panel. If, for instance, a man starts up a pump before a necessary level is reached in a tank, a horn sounds to warn the operator of his error.

In the work with Du Pont, Carmody picked up a few cost-cutting tricks. Actual instruments were used in the first panel; later models just as effectively employed a movable pen on a photograph of the instrument dial. The firm learned, too, that by using materials like Masonite, it could build a panel relatively economically.

Although the panels incorporate some basic interlocks (for automatic responses), most responses are provided by the instructor who "takes the part of the process." It would be possible to put an analog computor in the system to permit completely automatic response. Such a step would be hard to justify economically, however.

In general, operating people have been quickest to realize the value of the process trainer. And Carmody has found that the idea has not met with the hostility anticipated from the older operators. "Just the opposite," Carmody says, "we find them highly enthusiastic. They report they often have wondered what would happen if they did certain things. The simulated panels give them a chance to satisfy their curiosity and to learn how to handle very unusual conditions."

Another example of Carmody Corp.'s work is a fractionation column trainer it developed, also in collaboration with Du Pont. Just over 7 ft. high, the panel is hinged in the middle, folds into a compact, portable case. The trainer is being used to teach basic distillation procedures.

What's Wrong: The instructor can establish "upset" conditions on the trainer and then ask the class what corrective action should be taken. For instance, he can set the panel to show a 20% reduction in feed rate to the column, and raise the temperature indicator and drop the differential pressure dial correspondingly. The students' job is to determine whether these three panel changes truly indicate reduced feed or whether instrument control is in error.

The student should be able to point out that, because pressure has dropped and temperature risen, the feed rate definitely has gone down and the instruments are in working order. To prove this he should ask the instructor to push the "stop" and "start" buttons for the feed to see whether the dial goes to zero and then returns to its original position.

No Calls: The panels are constructed so that maintenance is held to a minimum. In fact, one of the firm's proudest boasts is that it has never made a maintenance call. "But that can be a problem," says Carmody. "We never get a chance to find out how they're being used after we finish our part of the training program." In at least one case, however, a firm said a panel paid for itself in two weeks.

Philosophy of Training: Carmody Corp. considers its simulated panels to be only a part of its training service. The instruction program, Carmody feels, must be tailored to the special problems of each job.

William Lybrand, a human-factors psychologist who is director of training, puts it this way: "We can't know what to prescribe until we've made a complete diagnosis in cooperation with customer personnel."

His first step in devising a program is training analysis. On the basis of that, the firm feels qualified to engineer and recommend the needed training aids.

But putting this principle into practice requires several different types of specialties: The corporation is run by a five-man team. At the head, of course, is Carmody, who has both a military and industrial background. He was, for example, director of education and then sales manager for Link Aviation (and a firm advocate of the policy that has put Link-trainer and Link-building into the language).

Lybrand, the newest member of the team, taught at the University of Maryland and worked as project director of Psychological Research Associates. The chief engineer, Frank Salisbury, is regarded by his colleagues as something of a mechanical genius. A pilot since 1923, he founded and headed Frontier Aircraft, a company formed to develop (in conjunction with Dow Chemical and Fleet Aircraft) the first all-magnesium aircraft. Arnold Krueger, the factory superintendent, and Robert Pollock, secretary-treasurer, round out the team.

Growing on Training: Its growth record to date indicates Carmody Corp. is filling an industry need. Shortly after it was formed in May '54, it found it was outgrowing its quarters and moved to a new building which tripled its working space. But no sooner had it settled there than this location also proved to be inadequate. Now, in its third home outside the Buffalo airport, the firm has again doubled working space, has an 11-acre site to grow on.

Last year, Carmody Corp. did about $430,000 worth of business, mostly with the government. It should top that easily as its industrial training equipment catches on.

Ed Carmody, for one, sees no reason why the company shouldn't. Says he: "Whether you're handling an electrical current or a liquid product, the training program is built around man's ability to sense what's going on, make a sound judgement and respond efficiently. This ability, a critical link in any man-machine system, is an ever-present factor in all situations. Until God changes man, we can utilize this ability best through proper training methods and equipment."

Test-Meter Safety Note

Polymer Corp. Ltd. (Sarnia, Ont.) has joined the growing list (*CW, Jan. 25, p. 76*) of firms making public the safety information gained from plant mishaps. Polymer has revealed the cause of a recent explosion of a standard wet-test gas meter that seriously injured two men at its plant. Included in the report: precautions taken to prevent accidents of this type.

The meter, used for oxygen flow measurements on one day and acetylene the next, exploded when the acetylene exit gas came into contact with a warm furnace. Examination of the meter showed it had about 5 liters of free space, probably held residual oxygen that mixed with the acetylene to form the explosive mixture. Result: new labels on test meters specify purging with a minimum of 25 liters of nitrogen before and after use.

240-S

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USS STEEL DRUMS

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German-developed infrared generator (circled) heats by absorption rather than by convection.

Foreign Unit Fires New Interest in IR Heat

A new gas-type generator, said to produce infrared radiation more cheaply and efficiently than currently available infrared generators, fired interest this week in infrared energy for plant heating purposes.

Developed in Germany by Guenther Schwank and used extensively in Europe, the generator is now being made under license by Hupp Corp.'s Perfection Industries Division (Cleveland), which has just begun its first major marketing effort.

Already in use in at least two chemical process industry plants, the Schwank infrared generator is touted as particularly suited to space heating of high-bay buildings, reportedly can reduce heating bills 20-50%. But it has also speeded the unloading of frozen coal from gondola cars, by thawing a car in seven minutes, instead of the full hour required when tubular gun burners are used. And the generator has eliminated humidity-caused corrosion of steel stock by maintaining the steel temperature well above dew point.

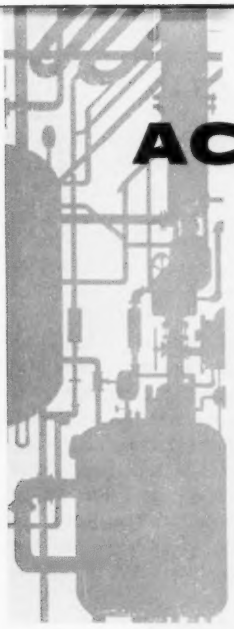
High-Temperature Operation: Key to the generator's efficiency is the surface combustion of an air-gas mixture on a ceramic mat that soon reaches a temperature of 1650 F. The mat emits radiant energy with wave lengths mostly between one and 11 microns (the greatest quantity with three microns).

This temperature gives a high radiation efficiency (about 50-60%) and high heat-transfer rate. The wave length is in the band most readily absorbed by the objects on which it falls.

Ceramic Catalyst: To obtain surface combustion, gas and air are supplied to nozzles in a predetermined ratio. The mixture burns as it leaves the mat holes (a mat has 7,200 holes of 0.055-in. diameter when used for natural, mixed or LP gas, 8,800 of 0.043-in. diameter for manufactured gas) in the 5x7-in. ceramic mat. The incandescent mat surface also acts as a catalyst, helps the combination of gas and oxygen.

The Perfection-designed Schwank generators are grouped in multiples of eight ceramic mats, called rayheads. The rayheads are assembled with aluminum reflectors, which help direct the infrared wave lengths toward the surfaces to be heated. The thermostatically controlled generators may be overhead or sidewall-mounted. Fixtures may be overhead-mounted at heights from 7 to 60 ft. without the efficiency problems of other gas infrared heaters.

For example, major - competitor Prat-Daniel Corp.'s Thermobloc Division (South Norwalk, Conn.) says its Panelbloc gas infrared generators are most efficiently mounted at 8- to 12-ft. heights. While Panelbloc generators aren't considered competitive in high-bay buildings, Thermobloc says its



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1932

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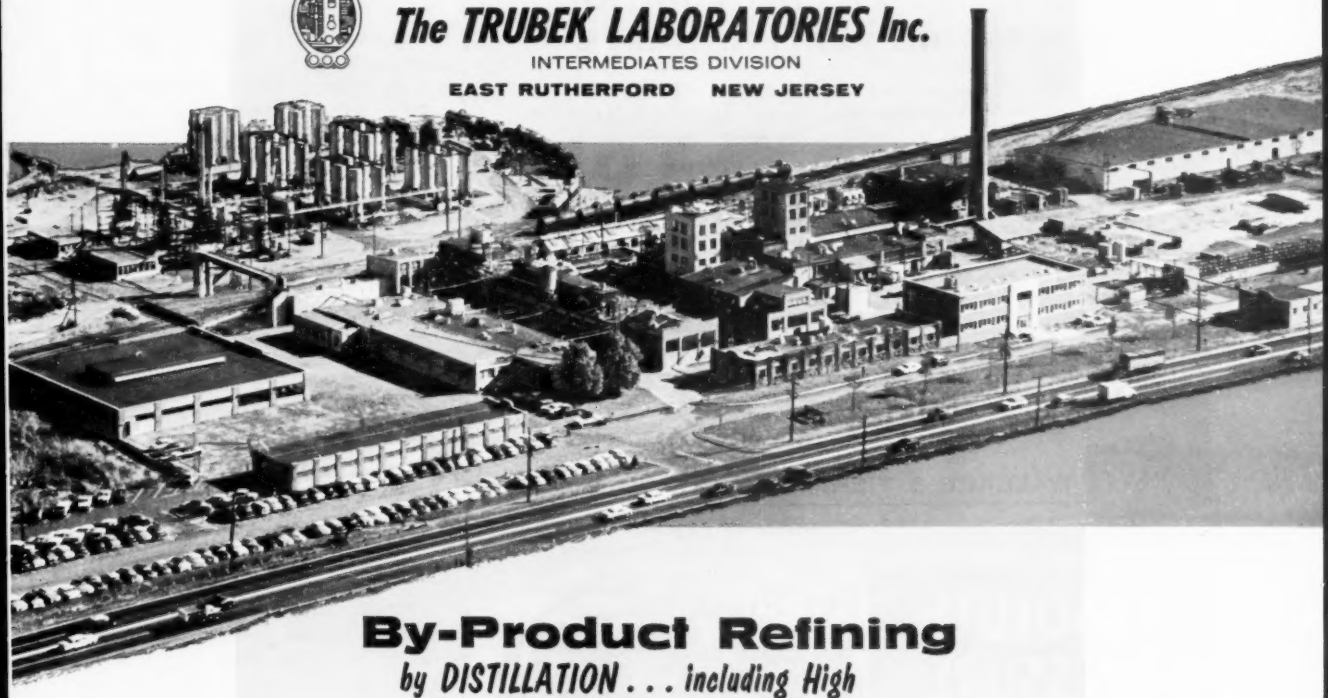

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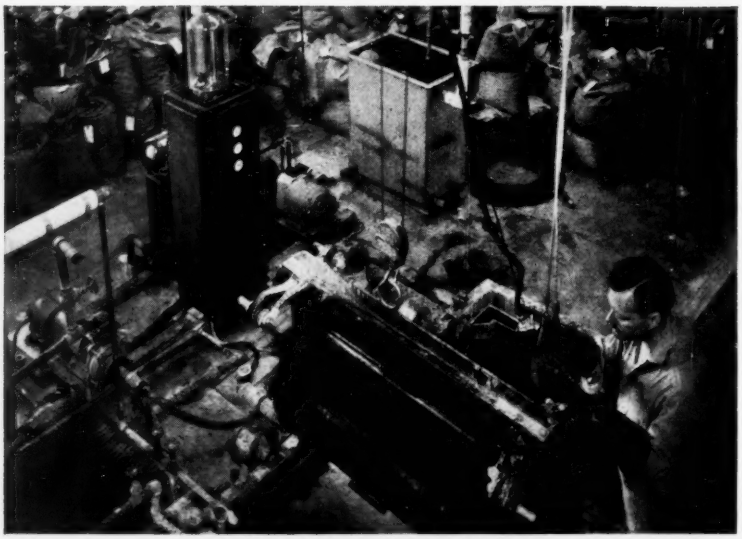

Cyanide waste treatment system in plating room of the Palnut Co., Mountainside, N. J.

THIS SMALL PLATING PLANT BENEFITS FROM CHLORINATION IN TREATING PLATING WASTE

W&T Alkaline Chlorination solved the Palnut Company's problem of how to treat toxic cyanide plating waste effectively and cheaply. A flow-through process permitted installing the equipment right in the plating room. No new plant space was needed. In addition, because the treatment is simple to operate, one man runs the equipment as part of his regular work.

By using chlorine gas to treat the waste, savings were sufficient to pay for the chlorinator and its installation in less than a year.

Wallace & Tiernan makes chlorinators and chemical feeders for use in any size plating plant—large or small. Learn all the advantages of treating plating waste with chlorination in Bulletin I-62, which gives full details about W&T Alkaline Chlorination.

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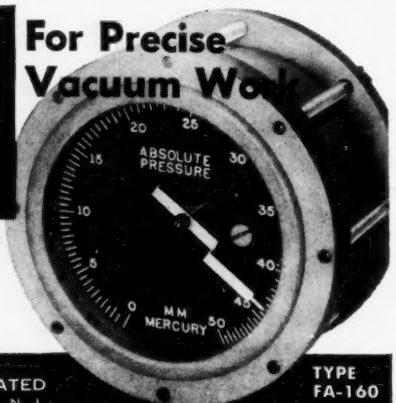

Ranges: From 0—50 mm to 0—800 mm Hg. absolute in six ranges
Accuracy: 1/300 of full scale
Sensitivity: 1/500 in *all* ranges
Dial Size: 2¾" or 6" diameter

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TYPE FA-160

Write for Publication No. TP-28-A

PRODUCTION

units cover greater floor areas because of their tube-and-fin type of construction.

The Schwank generator has a greater heat intensity, however, which makes it more advantageous than the Panelbloc for use in thawing frozen solids.

Comparison Difficult: Usual techniques for measurement of space heating are not applicable because infrared rays do not warm the air through which they travel. But radiant energy can be measured with an Eppley thermopile, converted into Btu./sq. ft. Ability to concentrate heat where it is needed—floors, machinery, people—generally cuts fuel costs, Perfection claims.

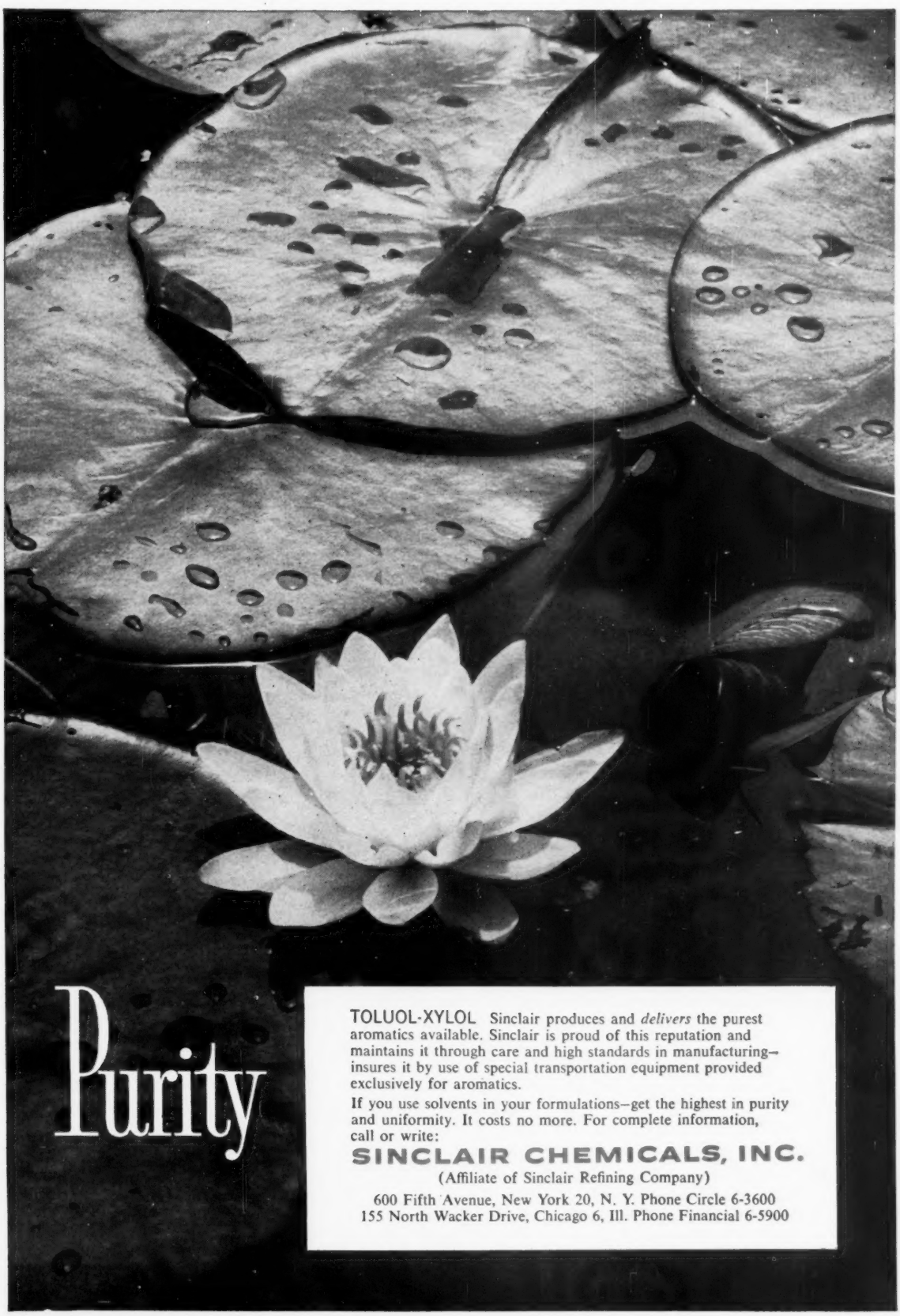
Example: a 754,000-Btu. installation (26 generating units) heated a 6,400-sq.-ft. all-steel building with concrete floor where a 1-million-Btu. conventional space-heating system would have been required. Heating cost using natural gas (Ohio location) was 0.16¢/sq. ft.

The main drawback to installation of the Perfection unit in some chemical processing areas rests on its having an open flame. Although all the combustion takes place within 1/16 in. of the ceramic surface, the unit could probably not be installed in many locations considered hazardous by Article 500 of the National Electrical Code. Since the Panelbloc gas infrared heater has no open flame, it has an advantage when used in hazardous locations.

But with the newer Schwank system broadening the field open to gas infrared heaters, such devices may find more and more applications throughout the CPI.

EQUIPMENT

Pressure Logger: Data-Master Type 5, manufactured by Hanson-Gorrill-Brian, Inc. (Glen Cove, N.Y.), is a new automatic digital data logger that sequentially scans 24 or 48 pressure lines into a single transducer, eliminates the need for multiple transducers. Switched volume of only 0.1 cu. in. results in high accuracy pressure measurements (0.25% including transducer) by minimizing air-flow disturbance and pressure drop. Output data can be presented on punched tape and typewriter in suitable form for computer or tape-to-card converter entry. Range: 0-350 psi.



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Technology
Newsletter

CHEMICAL WEEK
February 8, 1958

Some of National Lead's work on polymerization catalysts (*CW Technology Newsletter, Dec. 21, '57*) is starting to emerge. Four recently published Australian patent applications begin to delineate the research pattern that resulted in the firm's teaming up with Celanese in a polymerization project:

- Application 29,197/57 describes a polyethylene polymerization catalyst containing carbon-to-titanium double bonds. The compounds have the general formula R_n Ti X_{4-n} in which R is an alkyl or aryl group; X is an alkoxy group or halogen when R is an aryl group; X is an alkoxy group only when R is an alkyl group and when subscript n is one or two.

- Application 29,198/57 deals with a similar catalyst for making polystyrene.

- Application 29,199/57 covers a method for making an olefinic polymer using an organotitanium catalyst containing one or two titanium-to-alkyl (or aryl) groups where titanium has a valence of two or three.

- Application 29,196/57 describes a method for making polymers of propylene, butadiene, isoprene and chloroprene using a related catalyst system.

•

The Russians are reporting more progress in dyeing trees *in vivo*. Word from Moscow now is that Pyotr Molotkov is treating trees for five to ten days with special solutions. Beech treated with ferrous sulfate is said to take on a steel color; treated with cupric chloride, it takes on a pearly sheen.

First reports on the Russian work in this field were noted several years ago (*CW, Oct. 31, '53, p. 39*). A somewhat similar process was tried out in this country (in Maine) after World War II, but it did not prove successful. And work in Germany along the same lines has been reported (*CW, Dec. 5, '53, p. 4*).

•

The Russians are also looking into problems of space travel. Its scientists reason that oxygen (for breathing) would take up far too much valuable space aboard a manned rocket going through space. The answer, according to Piotr Isakov, may be chlorella, an algae that feeds on carbon dioxide and produces oxygen. In addition, the algae could serve as food.

•

U. S. I. is building a pilot plant to make tantalum and columbium at its research labs in Cincinnati. It will employ a sodium-reduction process similar to the one it worked up for titanium and zirconium. It will, in fact, use some facilities used for making those metals. First production is scheduled for April, at a 1-ton/month rate (approximately ½ ton of each metal). Output can be stepped up to 3 tons/month by operating around-the-clock.

The firm is doing this independently. It says, however, that any

commercialization of its work will be by Mallory-Sharon Metals—in which U. S. I. has a one-third ownership.

•

New antioxidants for polyethylene have been turned up by researchers at Bell Telephone Laboratories (New York). The protectants are combinations of several additives, are claimed to be 10 times as effective as presently used antioxidants. Compounds tested include substituted thioethers formed by condensation of aromatic amines or phenols with sulfur dichloride. They are effective in conjunction with carbon black. (Conventional protectants tend to lose their effectiveness in the presence of carbon black.)

Several of the new antioxidants, Bell reports, provide protection for more than 2,000 hours at 140 C—equal to about 20 years of normal service life.

•

Polyester resins for preservation of wood?

A jacket of reinforced polyester or epoxy resins (on top and bottom as well as sides) completely prevent rot in kiln-dried wood, according to findings disclosed this week at the Chicago conference on reinforced plastics (sponsored by the Society of the Plastics Industry). This may launch the plastics into competition with other chemical preservatives. One potentially profitable application of such coatings may be in jacketing of marine pilings—yearly damage of which runs to $50 million/year (*CW, June 8, '57, p. 72*).

•

Power output has been stepped up at another boiling-water reactor. Following the doubling of power at Argonne National Labs. (*CW, Jan. 11, p. 70*), General Electric has increased the power output of its Vallecitos boiling-water reactor by 50% (to 30,000 kw. of heat, from 20,000). The boost has been approved by the Atomic Energy Commission. The new output is enough to generate approximately 6,500 kw. of electricity.

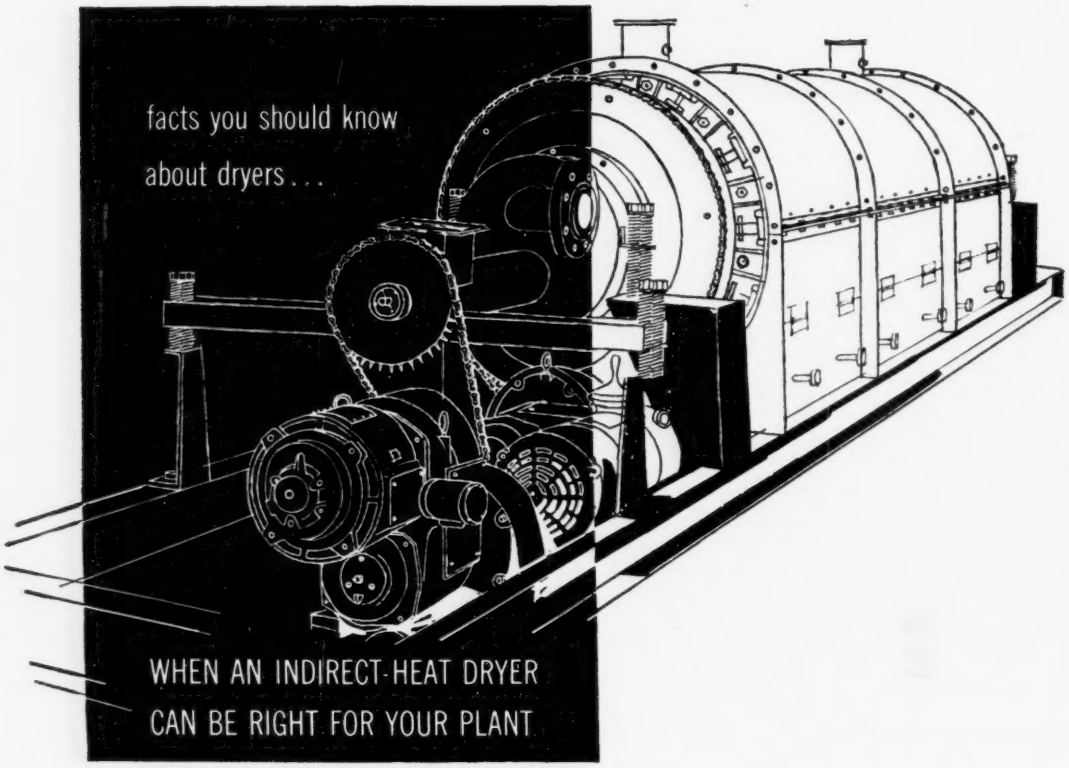
•

A new type of plastic-lined steel pipe is being offered by Jones & Laughlin Steel Corp. (Pittsburgh). Marketed under the name Jal-Jacket, it consists of a rigid polyvinyl chloride tube jacketed with welded steel pipe. The corrosion-resistant pipe results from three years of research by J & L's product development division in cooperation with the Electricweld tube division at Oil City, Pa.

•

Tee-Pak, Inc.'s (Chicago) process for polymer deposition on wood fibers has been licensed to Marathon, a division of American Can Co. The process, to be developed further by Marathon, is said to be applicable to cotton, jute, nylon, flexible film, and other materials, is also said to be effective for mildewproofing cotton fabrics. Tee-Pak sponsored research at Textile Research Institute (Princeton, N. J.) on an acrylonitrile deposition-rotproofing treatment for cotton (*CW, March '16, '57, p. 112*).

who are the men
that
make
the
most
of
them?



For over 55 years, Louisville Dryers have been solving industry's drying problems and effecting marked economies. The records of this experience can often be applied to specific cases, possibly yours. For example . . .

Q. *My material is a filter cake, practically all minus 325 mesh, and must not contact furnace gases. It can be heated to 500° F. at least, without injury. What type of dryer would do the job best?*

A. You might consider using a direct-heat rotary dryer that utilizes clean, heated air as the drying medium—air heated by steam coils or a gas or oil fired heat exchanger. However, this introduces a considerable dust collection problem. Besides, from a standpoint of capacity, it is inefficient as well as from a heat-cost standpoint. This makes it unduly expensive. Therefore, a type of indirect-heat rotary dryer is indicated which would greatly reduce both the dust problem and the heat cost.

Q. *What is meant by an indirect-heat rotary dryer?*

A. One in which the material to be dried is warmed by contact with the heated metal surfaces, which in turn are heated by the medium used (usually furnace gases or steam). Those using furnace gases are called "indirect fire dryers". Atmospheric and vacuum drum dryers are examples of steam-heated indirect dryers, but the type in greatest use is the steam tube dryer. This is often referred to as the "Louisville Type" because of the thousands of Louisville Steam Tube Dryers built during the past 55 years.

Q. *How does an indirect-heat dryer minimize the dust problem?*

A. In an indirect-heat dryer, only enough air is admitted to carry off the evaporated moisture. Thus, the air has nothing to do with the heating of the material. Generally, this low air velocity results in insignificant dust loss.

Q. *How does this differ from the operation of a direct-heat dryer?*

A. In direct-heat dryers, the hot air furnishes the heat for drying besides removing the evaporated moisture. The amount needed to supply the necessary heat results in a sufficiently high velocity through the dryer to carry out an excessive amount of fine material particles.

Q. *It seems I need an indirect-heat dryer. How can I get competent advice and more information regarding my particular requirements?*

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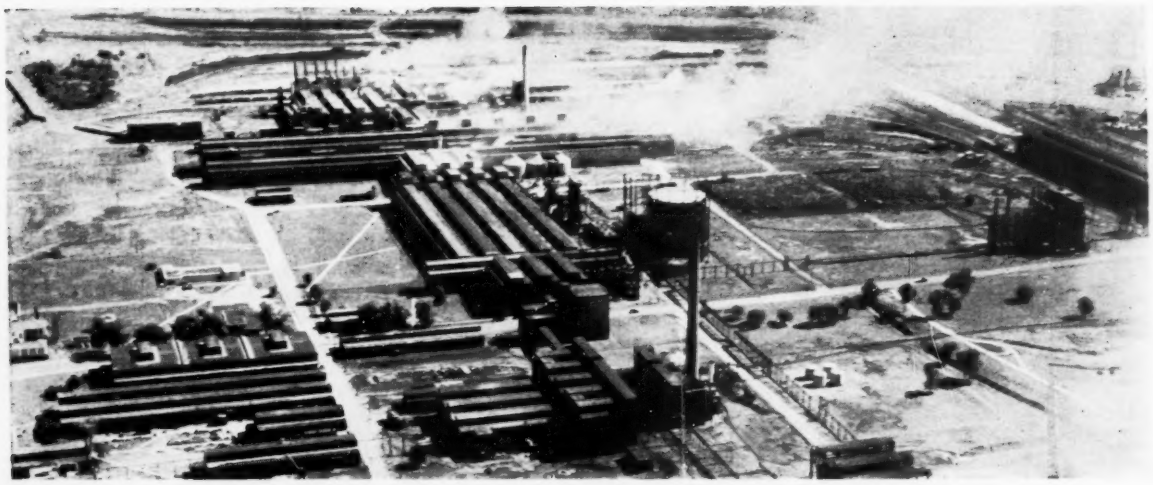

Sprawling Muscle Shoals plants are backbone of big TVA fertilizer production.

TENNESSEE VALLEY AUTHORITY FERTILIZER DISTRIBUTION

(thousand tons)

	1958	1957	1956	1955	1954	1953	1952	1951
			(year ending June 30)					
Ammonium Nitrate								
TVA	125	141	139	190	188	195	197	136
Total consumption	—	1,081	941	1,116	925	846	799	638
TVA market share	—	13%	15%	17%	20%	23%	25%	21%
Calcium Metaphosphate (tons P_2O_5)	80	45	42	39	35	23	17	15
Diammonium Phosphate	25	14	5	0.7	—	—	—	—

TVA Fertilizers Stir New Controversy

TVA's big Muscle Shoals ammonium nitrate plant and fertilizer distribution program is again a center of controversy. Touching off this week's flare-up:

• TVA's efforts to get a freight rate set for its highly concentrated phosphoric acid that would make the TVA product more competitive with acid produced by private industry.

• Spencer Vice-President Joe Culpepper's potshot at the way TVA is seemingly ignoring the key recommendations of a report that had suggested TVA changes in the fertilizer program.

Old Story: These events are only the latest examples of growing industry criticism of TVA's fertilizer and fertilizer acids program. The main gripe still concerns ammonium nitrate production. TVA will turn out some 125,000 tons in the '58 fiscal year, and 110,000 in fiscal '59. That represents a sharp drop from the peak output, 197,000 tons, in '52 *(see table)*.

This nitrate is sold at what industry terms "cut prices." TVA pegs its nitrate at some $4-7/ton under the private industry price. Says one chemical sales manager: "the cut-rate price . . . is such . . . that several good dealers in one area won't even handle our product. They just can't move it."

Another states that TVA "follows a flexible pricing policy. When we raise or lower prices, they do the same thing. So you can't eliminate the price spread."

Spencer, Monsanto, American Cyanamid and Commercial Solvents are among the companies hurt most by TVA's policies. (Allied, prevented from distributing in the Tennessee Valley area by unfavorable freight rates, has felt little.) They believe they are losing business equivalent to the TVA production, and even where they haven't lost out, they must operate at very low profit margins. TVA's decision, over a year ago, to offer the nitrate in 50-lb. sacks further cut profit margins—private industry had to go along with the more costly packaging, but couldn't tack the increase onto price.

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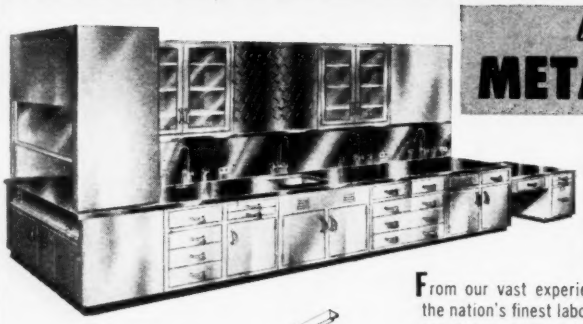

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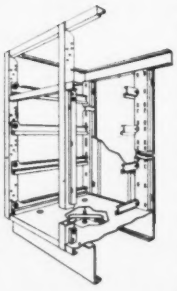

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SALES

Summary Discord: Many of their objections were covered in the report made by an 11-man committee, appointed by TVA itself. The committee—comprised of three specialists in agricultural economics, statistics and public administration; four agronomists from land-grant colleges; three representatives of commercial producers; and one co-op member—surveyed the agency's distributor demonstration program. It pointed out that while the program was proving effective in educating farmers in the benefits of fertilizer, increasing fertilizer consumption, and raising output of high-analysis products, it still was not nearly what it should be.

Loose administration of the program, and weak adherence to the program objectives was evident. There were cases where dealers demanded that farmers buy non-TVA fertilizers in order to get TVA materials, too.

As a result, the committee made 32 recommendations. But TVA, in a 40-page summary of the report, promptly took full or limited exception to six of the most important recommendations. These would have set a precise definition of farm uses for which the TVA products qualified; prevented TVA from considering plant capacity in determining output; set limits on the time a newly developed material can be distributed in the program; broadened the geographic distribution of TVA materials; prevented TVA from distributing fertilizers with quality inferior to commercially available products; and eliminated TVA marketing of mixed fertilizer materials when the same material is commercially available.

Reaction: It was with this summary that Spencer's Culpepper took sharp issue. He called on TVA to adopt market research as an aid in production scheduling. And he charged that "TVA would appear to want to sidestep the issue dealing with the area of distribution . . . proposes to continue its program of teaching the same child to walk year after year."

Culpepper believes that "if TVA . . . applies . . . the recommendations . . . relative to the six vital points, many of the objections of the fertilizer industry to TVA's program will be eliminated."

Spokesmen for American Cyanamid, Monsanto and Commercial Sol-

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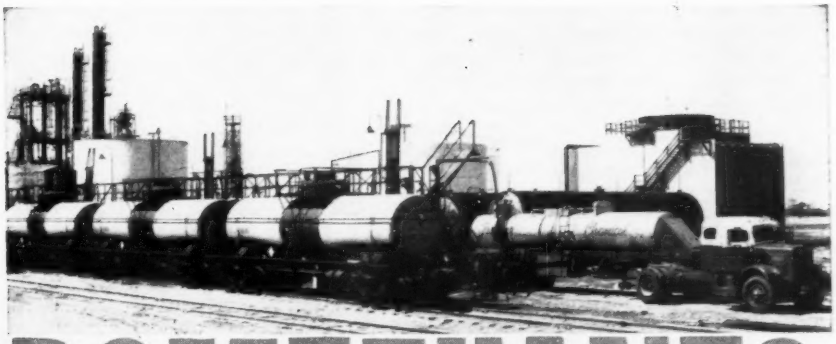

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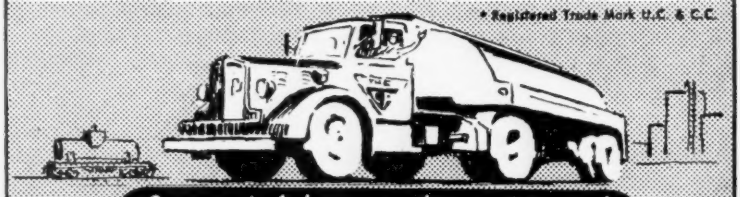

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vents also backed the complete set of recommendations.

Mixed Opinion: Reaction elsewhere is mixed. Some believe that TVA should get out of the ammonium nitrate business entirely. They say that with surplus commercial capacity available and most companies vigorously promoting fertilizer use, TVA's ammonium nitrate venture isn't needed.

Not all industry executives take a hostile attitude toward TVA. Most recognize, for example, that the agency has made major contributions: TVA's continuous ammoniator is now widely used; and many think that to a limited degree TVA has stimulated fertilizer markets.

Knoxville Comment: TVA head-

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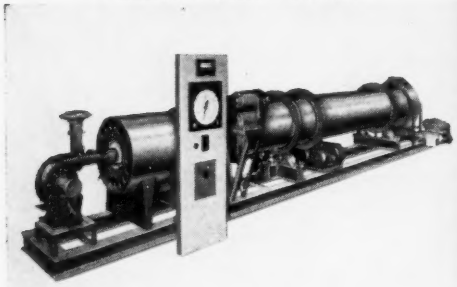

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quarters are sensitive and sympathetic to criticism of commercial producers. But spokesmen feel the criticism of ammonium nitrate operations fails to recognize TVA contributions to farming and fertilizer production in general. Pointing to Congressional instructions to TVA, its officials emphasize that TVA's primary goal is to "improve and cheapen the production of fertilizers". . . .

The committee's report, says TVA, "leaves no doubt that the program is in the interests of farmers and, by and large, is working well."

Educational Program: TVA says ammonium nitrate production is geared primarily to showing farmers how much they can gain by using any nitrogenous fertilizer. Programs designed in cooperation with distributors are aimed basically at education and are reviewed yearly. The program "does not lend itself to market analysis alone and is not identical with sales potential."

Time and geographical restrictions on fertilizer distribution, avers TVA, would act against its educational goals. TVA feels that appraisals by state agencies offer the best way to determine scope of distribution. And they say that farm conditions, not time, are the controlling factors governing the period of TVA fertilizer distribution.

At the moment, TVA is implementing many of the committee's recommendations. The entire distribution program (in Tennessee) is under review. Use of TVA materials on close-growing crops will be further emphasized; upper limits on distribution will be set up in states where college officials believe such limits are appropriate.

Washington Prospects: Meanwhile, TVA's attitude could change. Two appointees to TVA's board of directors, Arnold Jones and Frank Welch, are awaiting Senate confirmation (*see Washington Newsletter, p. 37*). Both reportedly are disposed favorably to the six key recommendations.

Program revisions suggest that TVA-industry competition will lessen in severity in the future. How much, however, won't be known until the board takes final action. But, undoubtedly, commercial producers will continue to feel the pinch of TVA products in a tightly competitive field for a long time to come.

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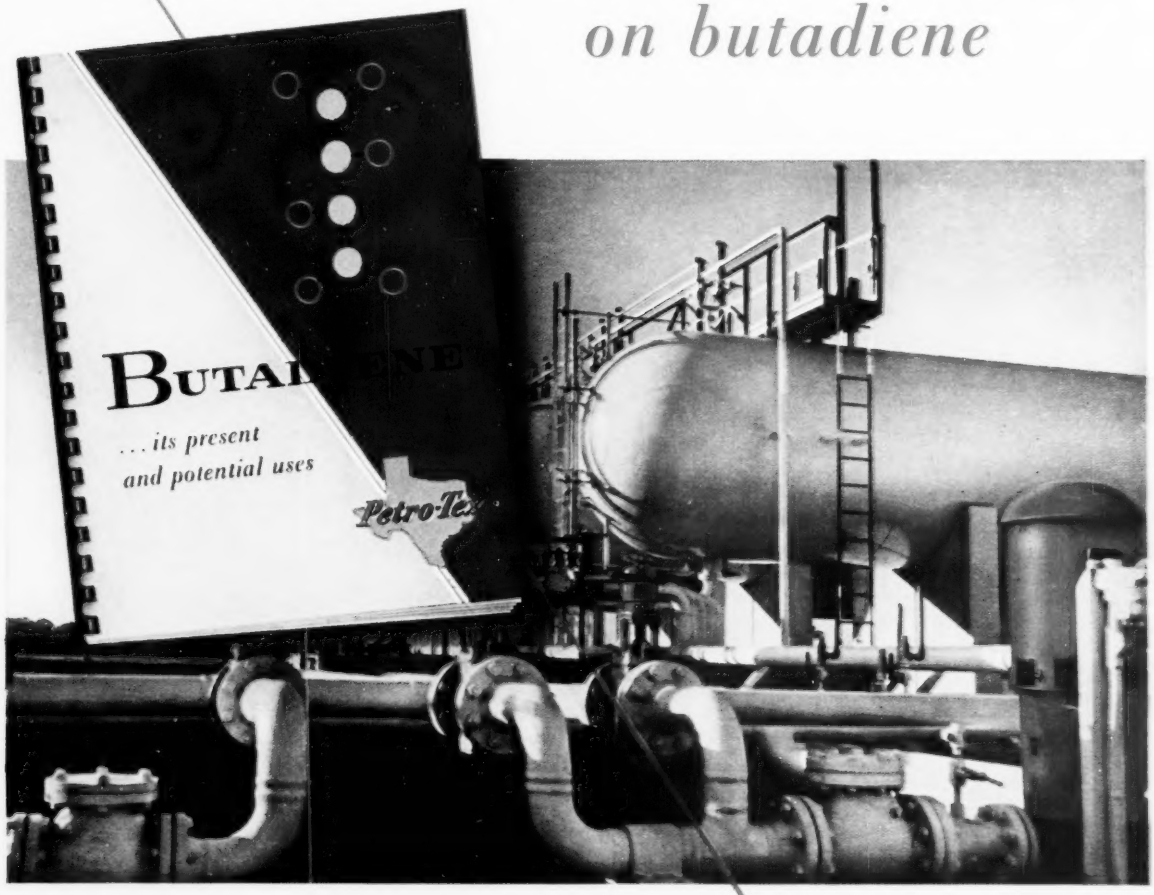

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58	CeO_2. CERIC OXIDE	215 216	99.8 99.9	0.2 (largely La + Pr + Nd). 0.1 (largely La + Pr + Nd).
59	Pr_6O_{11}. PRASEODYMIUM OXIDE	726 729.9	99 99.9	1 La + Nd + smaller amounts of Ce and Sm. 0.1 Ce + Nd.
60	Nd_2O_3. NEODYMIUM OXIDE	628 629 629.9	95 99 99.9	1-4 Pr, 1-4 Sm, 0.5-1 others. 0.1-0.4 Pr + 0.1-0.4 Sm + 0.5 others. 0.1 (largely Pr + Sm).
62	Sm_2O_3. SAMARIUM OXIDE	822 823	99 99.9	0.2-0.7 Gd, 0.2-0.6 Eu, and smaller amounts of others. 0.1 (largely Nd + Gd + Eu).
63	Eu_2O_3. EUROPIUM OXIDE	1012 1011	98-99 99.8	1-2 Sm + smaller amounts of Nd + Gd + others. 0.2 (largely Sm + Gd + Nd).
64	Gd_2O_3. GADOLINIUM OXIDE	928.9 929.9	99 99.9	1 Sm + Eu + trace Tb. 0.1 Sm + Eu + trace Tb.
65	Tb_4O_7. TERBIUM OXIDE	1803 1805	99 99.9	1 Gd + Dy + Y. 0.1 Gd + Dy + Y.
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70	Yb_2O_3. YTTERBIUM OXIDE	1201 1202	99 99.9	1 Er + Tm + trace Lu. 0.1 Tm + trace Lu + Er.
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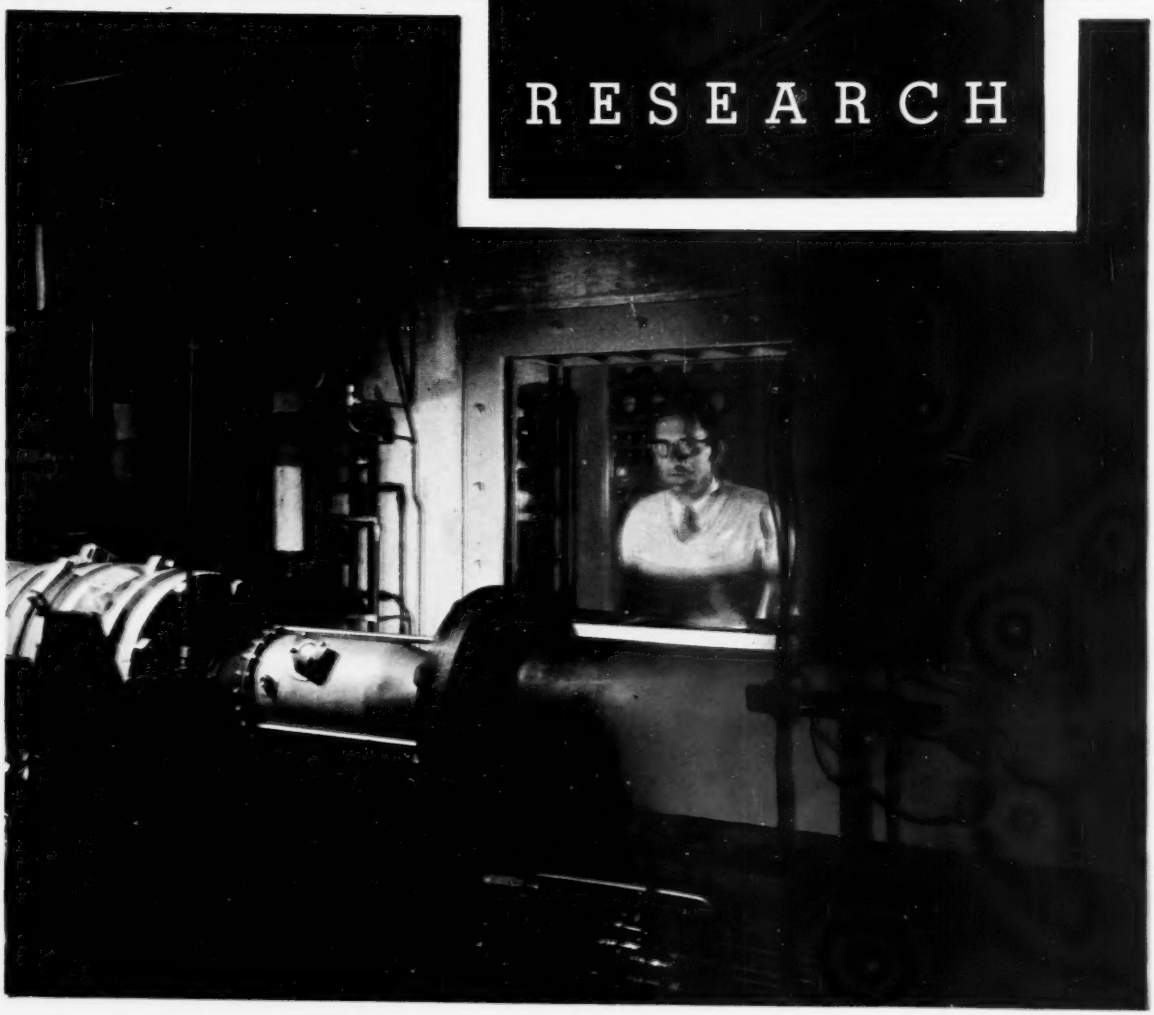


New Reactors Spur Fuel Research

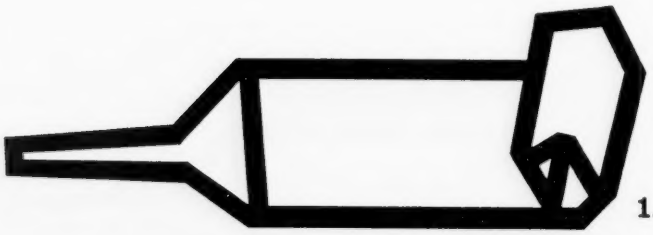
THE glowing turboprop engine shown above had logged 1,610 hours last week—but it was research time, not flight time. Like many another bench-bound engine, the big turboprop—at The Texas Co. labs in Beacon, N.Y.—is helping evaluate new fuels.

But at some other laboratories, some specially designed engines are going a step further. They're serving as chemical reactors in research for new fuels, chemicals and processes. Along with other novel reactors, they're the latest tools for high-temperature, high-pressure investigations.

Some secrets of the latest in engine-reactors are uncovered in patents recently assigned to Shell Development Co. (Emeryville, Calif.).

Shell's reactor ideas (U.S. Pat. 2,814,551; 2,814,552) are for reciprocating-compression devices in which potentially reactive gases are compressed, to bring them to a high temperature for a short time, then quickly expanded. Both inventions, states Shell, "may be used to perform chemical reactions, such as cracking of hydrocarbons, synthesis reactions, etc., or to determine whether such a reaction occurs when the gas is subjected to high temperature and pressure by compression."

The engine-reactors, says Shell, are "particularly useful for vapor-phase reactions, which have to occur in a very short time (e.g., of the order of microseconds up to a few hundredths of a second) in order to avoid un-



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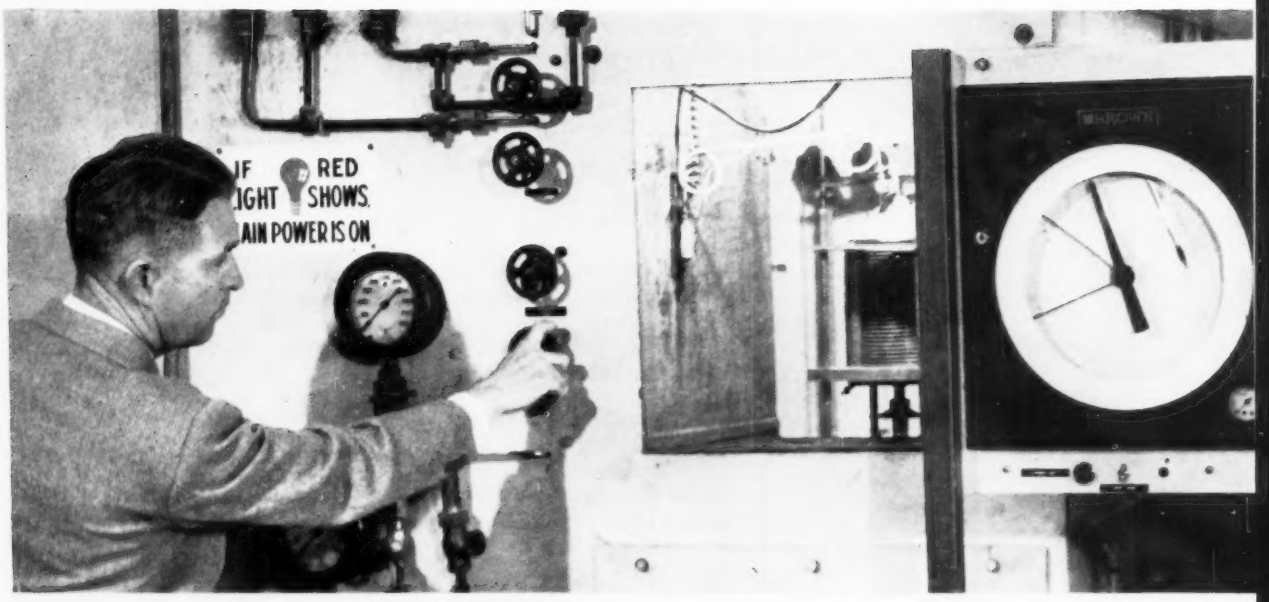


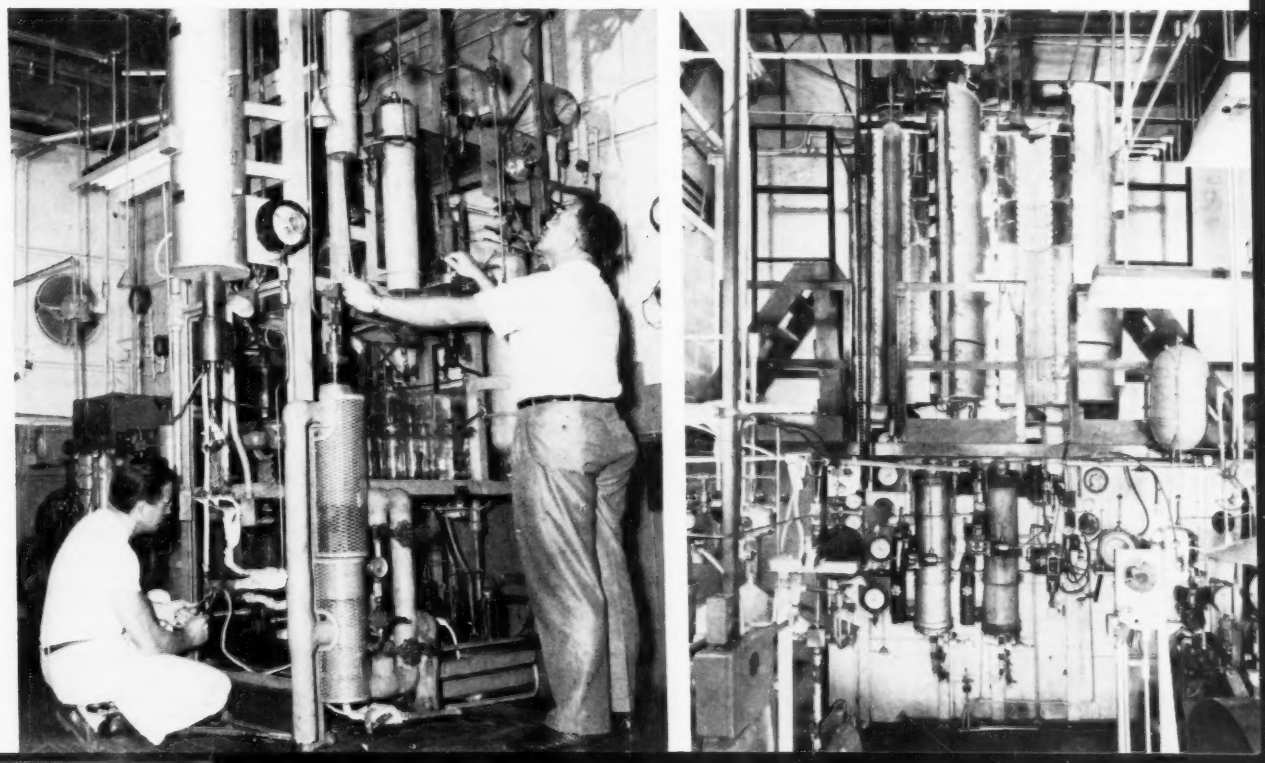
Socony Mobil's shaker bomb is potentially valuable for research in new chemicals, new reactions.

desirable side reactions. But they may also be applied to other reactions."

Acetylene Engine: An engine was also the subject of an earlier patent (U.S. 2,727,933), assigned to National Research Development Corp. (London, England). In it, the internal combustion engine is adapted to partial oxidation and pyrolysis of saturated hydrocarbons. But its primary object is to chart an improved process for making acetylene by the dehydrogenation of hydrocarbons.

The patent points out that arc processing, cracking, and partial combustion processing of hydrocarbons (e.g., methane, ethane, and ethylene) yield acetylene at the expense of high power consumption. One advantage of this route to acetylene, the firm explains, is that work may be obtained from the engine while

Moderate (3,000 psig., left) and high (10,000 psig.) pressures are used in phases of Texaco research.



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it is serving primarily as a reactor.

Shaker Reactor: Oil companies appear to be in the vanguard of research on novel reactors—though not all of the latter are actually engines. One case in point is Socony Mobil Oil Co.'s shaker bomb, developed at the firm's research and development laboratory in Paulsboro, N.J.

Socony considers its shaker bomb unique; a valuable new tool for studying high-temperature, high-pressure reactions where vigorous agitation, quick heating, and rapid cooling are desired. The company uses the bomb to study thermal processing problems, feels it might also be used to advantage elsewhere in chemical research.

The metal bomb, containing a test charge, is agitated mechanically, heated by an induction coil (from room temperature to 800-1050 F in seconds), quenched by a spray of cold water. Socony has found it valuable in studying reactions using solid catalysts, suggests it might be useful for studying pure thermal reactions (e.g., the thermal cracking of butane).

Zeroing in on Temperature: Gulf Research and Development Co. (Pittsburgh) has also devised a novel reactor, which it calls the rising-temperature-flow reactor. A complex device, it permits continuous increase in reactor temperature at a steady rate of 1-10 C per minute in the 25-700 C range, automatically locates the temperature of optimum catalytic activity.

Gulf has used the reactor to evaluate the apparent activation energies and kinetics for the dehydrogenation of cyclohexane over various catalysts. Among the catalysts tested so far: tungsten sulfide, platinum/aluminum oxide, chromic oxide/aluminum oxide, nickel tungstate/aluminum oxide, and chromic oxide catalysts.

The reactor has also been used to compare the activities of various catalysts. (For example, platinum/-aluminum oxide irradiated by a Van de Graaff accelerator was compared with the nonirradiated material. It lost some of its catalytic effect, but only temporarily.)

The Texas Co. is attacking similar problems using two new reactors (aside from its turboprop engine), one operating at 3,000 psig., the other at 10,000 psig. Both units are "contactors"—equipment in which gas and liquid are reacted. In the Texaco units, the gas and liquid are mixed before addition to the reactor. The refiner has been working mostly with hydrocarbons, studying reaction products and evaluating catalysts.

Not all the work in designing unique reactors has been shouldered by oil companies, however. Chemical firms are investigating them, too.

And the novel reactors devised by chemical firms are taking many shapes and forms. For example, one recent British patent (785,946) covers a combination reactor and furnace. A development of Union Carbide Ltd. (Sheffield, England), the device is for conducting exothermic reactions at controlled high temperatures. It will be particularly valuable in safely controlling the reduction of group IV, V and VI metallic halides with an alkali or alkaline-earh metal.

Some other reactor "originals" will be described next June at the Philadelphia meeting of American Institute of Chemical Engineers.

Staffers of Du Pont's engineering research laboratories are readying some of their latest work for this meeting.

Big Step Up: Although new reactors fare well in laboratory assignments, they haven't been scaled-up, successfully, to production duties. High hopes were held for the Cimmac reactor (*CW, Feb. 24, '51, p. 11*), on its advent some years ago, as a new commercial approach to synthesizing organometallic compounds. Developed by Cincinnati Milling Division, Carlisle Chemical Works (Reading, O.), the reactor mechanically activates metals (e.g., magnesium, sodium) by cutting them in presence of other reactants.

The Cimmac consists of a reaction chamber with baffles to hold the liquid reactants, a rotating cutter mounted on a spindle, and a mechanism to feed a rod of reactive metal against the cutter.

Conceived at the height of the Korean crisis, when machine tools (Cincinnati Milling's prime interest) commanded top priority, the Cimmac languished. Although about 35 or 40 have been sold to research laboratories, none has yet found an industrial niche.

Even so, Carlisle feels, there's always the chance the Cimmac's novel advantages (reactions are easily controlled) may eventually capture industry's eye. Such hopes aren't rare, either, among designers of Cimmac's newer, unconventional kin.

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LITERATURE

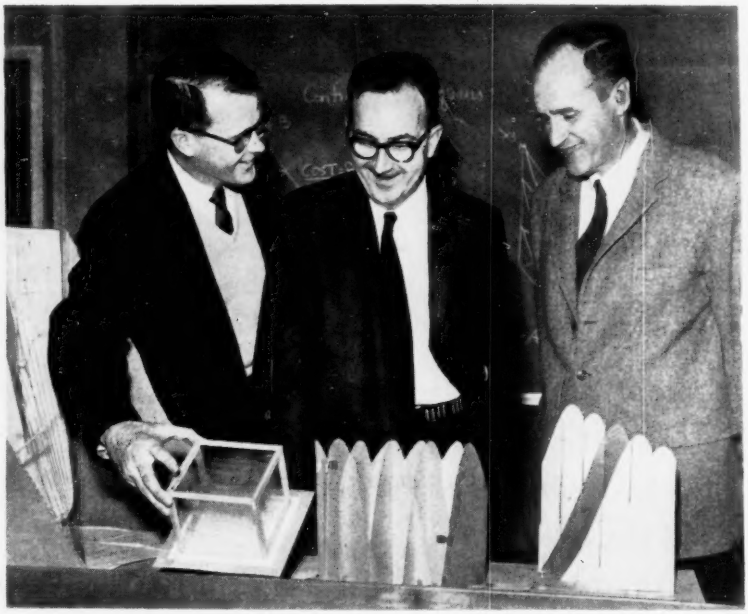
• "Electrostatics in the Petroleum Industry," written by scientists of Royal Dutch Shell Co. (Amsterdam), is a research report on the static electricity problem encountered in petroleum industry safety programs. It's available from Elsevier Publishing Co. (Amsterdam, Holland).

• "What's New for the Laboratory" is a listing of new equipment offered by Scientific Glass Apparatus Co. (Bloomfield, N. J.). The 20-page booklet (free) includes descriptions of Teflonware, desalting equipment, freeze-drying equipment, and other apparatus of similar nature.

• The seventh circular in a series titled "Standard X-ray Diffraction Powder Patterns" (National Bureau of Standards Circular 539, Vol. 7, 40¢) is available from the Superintendent of Documents, Government Printing Office, Washington 25, D.C.

• The Coffee Brewing Institute Inc. (New York) is out with these free, coffee research reports: The Nutritional Evaluation of Coffee (Publication 24), The Chemistry of Coffee (Publication 25), A Chemical Study of Coffee Flavor (Publication 26) and The Soluble Solids in Beverage Coffee as an Index to Quality (Publication 27).

• "The Lynn Index," a bibliography of phytochemistry, is being published as a series of approximately 80 monographs, each covering work reported on a given plant and its constituents. Monograph I, covering Centrospermae, is now available for $1 from the Massachusetts College of Pharmacy (Boston).



Shaping New Tools for Research

Models like those above helped instructors delineate fine points in the statistical design of chemical experiments at a just-completed course held at Harvard's Graduate School of Business Administration. Fifty U.S. and Canadian researchers attended the unique, 10-day course, which was sponsored by the Chemical Division, American Society for Quality Control. George E. P. Box, originator of the Box statistical method (*CW, March 31, '56, p. 56*), and consultants J. Stuart Hunter (*left*) and Cuthbert Daniel (*right*) explained latest techniques designed to cut process research time and expense. Similar courses, sponsored by the Chemical Division, are scheduled for Charleston, W. Va., Buffalo and Chicago during 1958.

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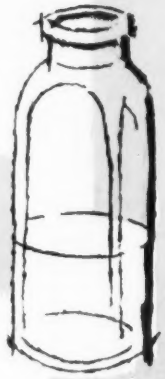

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Market
Newsletter

CHEMICAL WEEK
February 8, 1958

How good is the cellulose acetate business? For one major maker, Hercules Powder, the answer is disheartening: unsatisfactory profit-wise, not likely to improve. Result, says Hercules' President Albert Forster, in the company's just-released '57 annual report, is a decision to "entirely discontinue domestic manufacture of acetate."

Actually, Hercules has already stopped production of cellulose acetate molding powders, and has notified customers that it won't contract to provide acetate flake after this year. The firm, however, is working to set up other sources of supply for its customers, and tells *CW* that if all aren't provided for by the end of '58, it will continue to make acetate in '59.

Much of the Hercules business will go to Celanese—since Eastman Chemical, the other major producer, is more a captive consumer than an acetate merchant. Chances are that Celanese can handle extra traffic with little or no boost in its productive capacity. Estimates are that the company can turn out nearly 300 million lbs./year.

Shucking the cellulose acetate business is another indication that Hercules will emphasize its newer low-pressure polyethylene and polypropylene projects (*also see p. 28*) at Parlin, N.J. Incidentally, most of the acetate employees will probably be absorbed in the new operations.

•

But the acetate announcement isn't the only Hercules surprise— the firm's joint venture (with Imperial Chemical Industries) to make methyl methacrylate is being shelved. Initial plans revealed earlier (*CW Business Newsletter, July 21, '56*) called for a $10-million, 35-million-lbs./year plant to produce the translucent plastic material at Louisiana, Mo. A company equally owned by the two firms—Hawthorn Chemical—was set up to run the operation.

Halting methacrylate plans was mutually decided by ICI and Hercules for a potent economic reason—it no longer looked profitable. And Hercules' Forster also spoke of the general problems of operating a jointly owned venture, as well as such difficulties as transferring the pension rights of an employee to a subsidiary company.

Although Hercules has officially said that the project has been "postponed indefinitely," it's more than likely that the deal has been permanently dropped; the operating corporation, Hawthorn, is being dissolved.

Only U. S. methacrylate makers are Rohm & Haas and Du Pont, though several other firms have considered possible entry into the business. A number of these, reportedly, had lost interest because of process difficulties. Question some observers are raising now in the light of the Hercules-ICI withdrawal: Will others dust off pigeonholed projects, try again to solve the process problems?

Just out are some official statistics on pesticide inventories. And the figures are particularly significant in light of the growing public concern with insecticide spray programs (*see p. 96*). Carryover stocks of important pesticides (as of Sept. 30, '57), the U. S. Dept. of Agriculture reports, "averaged about as large as on the same date a year earlier."

There were shorter stocks of DDT, lead arsenate, and copper fungicide in '57, the USDA-National Agricultural Chemicals Assn. survey indicates, but these were more than offset by larger carryovers of 2,4-D, 2,4,5-T, and calcium arsenate. Benzene hexachloride (BHC) stocks were about the same size, while inventories of newer phosphorus insecticides (e. g., malathion, methyl parathion) showed some increase.

Some specifics: aldrin, chlordane, dieldrin, endrin, heptachlor, and toxaphene stocks totaled 32.5 million lbs.; BHC, including lindane (gross basis), 21.2 million lbs.; DDT, 24.3 million lbs. The latter was down to 77% of '56 stocks.

•

U. S. sulfur prices may soon go up $3/ton, if trade talk making the rounds proves accurate. But the predictions aren't new—last fall, following some sharp sulfur price cuts (*CW Market Newsletter, Oct. 12, '57*), there were many guesses that prices would be returned to their old level by Jan. 1. If the increase is posted, it would wipe out the '57 cuts, which did little more than slash sulfur producers' earnings for the year.

•

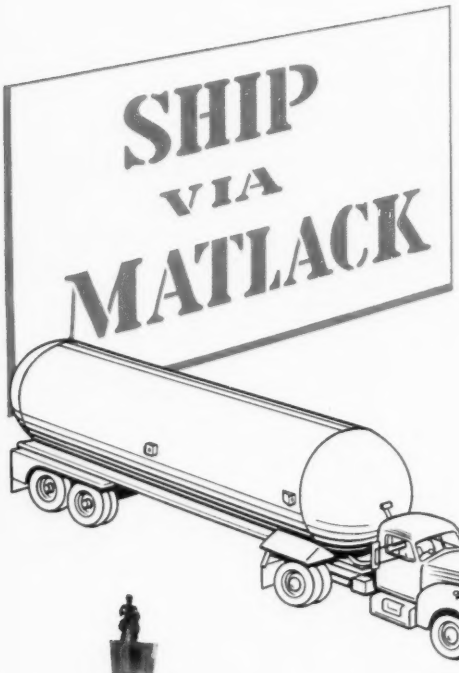
Monsanto has cut prices on two plasticizers by 10% in a frank bid for wider markets for them. Prices of patent-protected Santicizer 213 and 214 are down to 27¢/lb. and 29¢/lb. (tanks), respectively, representing cuts of 2½-3½¢/lb.

•

Unchanged ethyl alcohol prices on first-quarter schedules confirms earlier conclusions (*CW Market Newsletter, Dec. 7, '57*)—which contrasted sharply with comments published elsewhere—that the economic situation at that time precluded a hike. Now, alcohol makers may be unable to absorb any further increases in manufacturing costs (freight, containers, labor). Result could be a long-delayed increase in alcohol tags, probobly to go into effect with second-quarter postings. If any producer makes the breakthrough, the higher price would become industry standard within hours.

•

More petroleum-benzene capacity—about 18 million gallons a year—is on the way. Richfield Oil's (Los Angeles) initial plunge into petrochemicals (a venture first itemed here, *CW, Dec. 1, '56, p. 100*) is gearing up for production, should be making commercial deliveries by July. Output will be aimed at nearby customers (e.g., Shell's 135-million-lbs./year styrene-monomer plant at Torrance, Calif.), will not add much to the worrisome buildup of U.S. benzene stocks (*CW Market Newsletter, Feb. 1*).



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MARKETS

Pesticides: Hedgehopping into Trouble?

U.S. pesticide makers appear to have tapped a sales bonanza in the increasing number of broad-scale pest extermination programs conducted by the U.S. Dept. of Agriculture. But there may be a hitch. The USDA is running afoul of alarmed wildlife conservationists, dairymen, and irate citizens, some of whom are seeking court action this week. Backed by a crusading daily press, this highly vocal group may yet turn the potential pesticide boom into a boomerang.

The current court action is in the Eastern District Federal Court in Brooklyn, N.Y., where 14 Long Island, N.Y., plaintiffs will join forces to seek a permanent injunction to prevent the federal government from engaging in unwanted pesticide sprayings. The legal battle was touched off by the application of 3 million lbs. of DDT last year on as many acres of land in New York, New Jersey, and Pennsylvania. The program, government-sponsored, was part of an all-out fight against the invading gypsy moth pest.

Ravages of the moth notwithstanding, the plaintiffs are determined to prove that hazards to human and animal life of this and similar programs—not to mention alleged violation of constitutional rights of individuals—far outweigh their benefits.

Broad Ramifications: Their fight, if successful, could stall the government agency's latest program aimed at exterminating the fire ant now rampant in many Southern states. At stake are total requirements, in this project alone, for more than 40 million lbs. of dieldrin and heptachlor (representing some 400 million lbs. of compounded products). The chemicals, used at a rate of 2 lbs./acre of active material, will be applied to a total of 20 million acres in nine Southern states.

Several states have already made appropriations for the three-way federal-state-local undertaking; application of pesticides was begun in Nov. '57. The big push will come this spring. All methods of application will be utilized—e.g., spraying by air, ground equipment and hand units, and the blending of the pesticides with fertilizers.

Dieldrin and Heptachlor: USDA won't even guess about the relative amounts of dieldrin and heptachlor that will be used, says only that the materials will be bought as needed to do the job properly on varying types of terrain. However, dieldrin marketers report that right now about equal quantities of the two pesticides are being used, hope the proportions will remain the same for the whole job.

No time schedule for the fire ant project has been officially announced by the USDA, but spokesmen for the pesticide industry believe it may take 10 years to exterminate the pest. This, incidentally, is the reason pesticide makers do not expect this project to bring a spectacular boost of dieldrin and heptachlor sales in '58. Even assuming that some 20 million lbs. of both heptachlor and dieldrin will be used in the fire ant project, it's hard to pinpoint the resulting percent sales increases. Reason: available sales and production statistics compiled by the U.S. Tariff Commission lump all chlorinated hydrocarbon pesticides into one general category. There's a total sales figure of 43 million lbs. in '56; it is for the combination of aldrin, chlordane, dieldrin, endrin, heptachlor, isodrin and toxaphene. Total production in '56 was about 86.6 million lbs. So, although the percentage gain is hard to figure, 40 million lbs. over-all would provide a significant increase.

And it's entirely possible that if the USDA wins its war against the fire ant, the door will be opened a bit wider for other broad-scale pest extermination programs—further boosting demand for these and other pesticides.

Strong Opposition: But these potential fillips to the pesticide market may not materialize if the current heavy protests win legal stop-spray backing. And such a turn of events cannot be ruled out.

There's a tendency, in some quarters to brush off the opposition, to imply that members of conservation groups such as National Audubon Society are prone to the exaggerated anxieties of sentimental "bird lovers." But such an attitude invites trouble.

This is evident from the support given, directly and indirectly, by increasing numbers of other individuals and groups. Some strongly protest the spray programs; others take no sides, but urge more research. The latter groups, it appears, are not completely convinced by assurances—from the USDA and organizations such as the National Agricultural Chemicals Assn. —that existing federal legislation insures thorough and adequate pretesting of pesticides.

Keeping in mind that spray proponents can assemble as many independent supporters of their views—match "expert for expert"—here is the sort of opposition the spray programs face:

- Neely Turner, Connecticut state entomologist, last fortnight turned down the USDA's "informal request" for the state's cooperation in the '58 gypsy moth spray program. Turner, reportedly an outspoken critic of the spray programs, says cooperation by his state is unnecessary, wouldn't help eradicate the pest.
- Ernest Swift, executive director of the National Wildlife Federation, protested directly to Secretary of Agriculture Ezra Benson, has compared the fire ant program to "curing dandruff by scalping the patient."
- Three Harvard University professors (William Brown, curator of insects; Herbert W. Levi, curator of arachnology; Edward O. Wilson, biology professor) charge that Secretary Benson's department failed to consider alternative techniques of pest control. The professors fear that concomitant destruction of beneficial insects may upset the balance of nature, cause new infestations by pests now held in check by them.

Widely distributed is a report by John L. George, New York Zoological Society's associate curator of mammals. The report, prepared for the society and the Conservation Foundation, emphasizes that effects of pesticides on wildlife are inadequately understood.

New York Zoological Society and Conservation Foundation are not, however, taking sides in the scrap, but they do urge more research on pesticide hazards.

Broad-scale insecticide spraying is running into legal trouble.

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MARKETS

Also pushing for more research is Rep. Lee Metcalf (D., Mont.), who introduced a bill which, if passed, will direct the U.S. Dept. of the Interior to do research on the effects of chemicals on all life. Ross L. Leffner, assistant secretary of fish and wildlife (Dept. of the Interior), proposes that the research be conducted jointly with USDA.

Highly vocal is the National Audubon Society, which urges Secretary Benson to halt all large-scale spraying programs.

Last year the *New York World Telegram and Sun* crusaded vigorously —and most effectively—against the DDT gypsy moth program. And last month the relatively staid *New York Times* editorially joined forces with those opposing the spray programs, specifically attacked the use of dieldrin in the fight against the fire ant.

Noting that dieldrin is far more toxic than DDT, and that it is being spread at the rate of 2 lbs./acre (DDT was used at 1 lb./acre in the gypsy moth fight), the *Times* condemned what it implied was hasty action on the part of federal authorities.

Said the *Times*, "The cure to which the Dept. of Agriculture is suddenly committing itself on such an enormous scale may well be infinitely worse than the fire ant's burn. It is rank folly for the government to embark on an insect-control program of this scope without knowing precisely what damage the pesticide will do to both human and animal life, especially over a long period."

Suggests the *New York Times:* some of the $2.4 million* Congress is spending on the control program would better be used on projects to study the toxic effects of such chemicals on bird, animal, and human life.

Weighty evidence of spray hazards, which the *Times* implies can be marshalled against USDA, need not come from "prejudiced" individuals who have an axe to grind. Official government reports are full of ammunition.

For example, the Game Management Branch of the California State Dept. of Fish and Game reported** that in '53 dieldrin was used at a concentration of ½ lb./acre (a fourth as much as is now used in the fire ant program) to control an outbreak of the rice leaf miner, with unfortunate side effects. The observed mortality of wildlife, according to the report, was high—more than 400,000 fish, 400 egrets, etc.

Other uses of dieldrin in California have reportedly caused deaths of birds, snakes, jack rabbits, chickens, geese, turkeys, and even dogs. On the basis of such statistics the California state agency recommended application of dieldrin at ¼ lb./acre rate.

Special Conditions: But as one pesticide maker significantly points out, the conditions in the California projects were different in many ways from those encountered in southeastern U.S. For one, liquid spray was used against the leaf miner, whereas granular material is used against the fire ant. But this observation, as it stands, is considerably weakened as a counter-argument by inability of industry and government spokesmen to say, in good conscience, that dieldrin and heptachlor are less hazardous in the granular form than in liquid form. (Granular material is used because it is more easily applied to the ground where it is much needed in combating the fire ant.)

Proponents of the program maintain, of course, that application of the pesticides will be controlled carefully, point out that over-all blanketing of the Southern states will be unnecessary. Application will be to "islands" of land where fire ants are concentrated; hence any damage to wildlife will be restored later by inward migration of unaffected birds and animals.

Outcome of the current DDT legal battle is far from assured; and even if the conservationists should lose this round, chances are they will be at it again if they can collect enough new evidence.

On the other hand, government officials and pesticide makers readily admit that the dollar stakes are high, but quickly point out that critics should not under-rate the altruistic motivations of the pest-fighters.

The U.S. court now has the unenviable job of ruling on this highly technical yet emotionally charged issue. Whatever the decision, it's almost certain to be but the first round in a long and bitter contest whose effects are far from limited to industry.

*Congress in its last session appropriated $2.4 million to the USDA for the fire ant project. Individual states have so far provided well over $1 million in additional funds, and it's expected other Southern states will soon swell the available financial support.

**In a 209-page report titled "Pesticides; Their Use and Toxicity in Relation to Wildlife" —Game Bulletin No. 7, published in 1956.

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Prepare an aqueous solution of the sample to be analyzed at a concentration of 0.01-0.5% w/v active nonionic.

1. Place 5 ml Nonionic Reagent in a 25-ml graduate.
2. Add with volumetric pipette 1-5 ml of the nonionic sample to be analyzed.
3. Fill graduate with water to 25 ml, mix well, and let stand.
4. After 10 minutes, compare turbidity with that of standards of known concentration prepared by the same procedure.

Details of the method are given in the Analytical Procedure accompanying each bottle.

Nonionic Reagent is available at a nominal charge of $2.00 per quart bottle to cover the cost of standardizing, packaging, and shipping.

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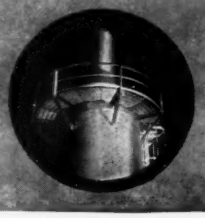

LIONEL CRAWFORD

Soap and detergent makers at lunch: A morning full of encouraging news helped stimulate appetites.

Good News Makes a Good Show for Soapers

Last week's meeting of the Assn. of American Soap and Glycerine Producers at New York's Waldorf-Astoria brought some 950 soapmakers together for a three-day look at their industry. They talked about last year (it was a good one), discussed current problems (production is outpacing consumption), and sized up the future (living standards up 50% by '68).

Out of a welter of speeches ranging in subject from motivation research to future developments in cosmetics, these were of special interest to specialties makers:

Sales Up: Looking over the first nine months of '57, E. B. Osborne, of Economic Labs, gave this heartening review of the industry's progress: over-all, soap and detergent sales were up 3% in tonnage and 8% in dollars, compared with the same period of '56—3.145 million lbs., valued at $760,881,000.

Good as these figures sound to the soapers, they're low when compared with what they'll be in 10 more years. That's the opinion of Arno H. Johnson, J. Walter Thompson vice-president and senior economist. He maintains that it will be necessary to increase the total sale of goods and services to consumers by over 50% within the next 10 years to keep pace with increasing productive ability. And he is figuring conservatively. Estimating the '68 production of goods and services at $650 million, he allows for an increase of 1.7% per year in population gain and 2% in per-capita productivity.

Johnson feels that soap and detergent sellers have missed potential markets in the past by not urging consumers out of what he calls the "habit lag." He contends that there has been an enormous movement of people from low to higher income groups in recent years, but that in making this shift they have failed to adopt the spending habits of the group they have moved into.

Explaining what this means in dollars and cents, Johnson asserted that if families had changed their soap consumption habits as rapidly as their income grew, the tonnage consumption of soap and detergents should have increased 23% between '50 and '56—twice the 11% figure actually achieved. This, he added, would have meant a dollar sales climb of 48% instead of the 33% reported.

Just how to get consumers out of the "habit lag" Johnson didn't make clear (advertising is a possibility). But he did dangle this thought-primer before the soapers: pulling the public out of the lag and into better buying habits could result in a 26% increase in sales by '60.

Less tuneful to his audience's ears was Johnson's estimate that the advertising bill for '68, when production is at $640-billion level, may be $17-21 billion. Soapmakers, traditionally among the big spenders for advertising, were quick to get the point—it'll

In the corridors, time for business talk; in the rooms, time for relaxation.

cost them twice as much to advertise in 10 years as it does now.

Tallow Tally: Results of a world survey on inedible tallow and greases were given the group by Carroll V. Danielson, of the U.S. Dept. of Commerce. Consumption of tallow and grease is increasing—but not by much. Figures for '56 indicate a world usage figure of 5.156 billion lbs.; those for '57 were only slightly higher, 5.161 billion.

By area, biggest consumers of tallow are North America, 1.908 billion lbs.; Europe, 1.352 billion lbs.; South America, 599.4 million lbs.; Asia, 411.6 million lbs.; Africa-Oceania, 328.1 million lbs.; and others, 561 million lbs.

U.S. exports of tallow and greases, now at 1.5 billion lbs./year, went principally to Europe (60%), Asia (20%), North America (9%), Africa (8%), South America (3%).

On a world basis, tallow and greases ended up mostly in soap, some 70% (3.6 billion lbs.) of it going into that use. And of that 3.6 billion lbs., about 68% went into laundry and industrial soap, the other 32% into toilet soaps. Feed accounted for 237 million lbs. of the material, and greases took 90 million lbs.

Trends: Discussing sales of soaps and detergents in grocery stores, Arthur C. Nielsen, Jr., president of A.C. Nielsen Co., pointed out some heartening trends. Gains in dollar sales of household detergents, he said, have been larger than total grocery sales—40% gain for household detergents over the last five years, compared with a 26% gain in total grocery sales.

Nielsen also cited the accelerated sales of toilet soaps. Traditionally slower than packaged detergents to respond to increasing soap and detergent usage, toilet soaps now appear to be expanding at a rate equal to the packaged products. Nielsen pointed out that between '53 and '55 toilet soap sales moved up only 6% while packaged detergents sales went up 14%. In '57, however, toilet soap sales rose 7% while packaged detergent sales increased only 6%.

Summing up, Nielsen appeared to express the feelings of most of the members of the soap and allied industries: "We have a real challenge ahead of us—to keep pace with the flood of new developments and new demands. The future will call for every ounce of ingenuity and marketing skill we can muster."

Surveying Surface Coatings: A useful picture of the surface-coatings business was given the assembled soapers by James Sayre, manager of Allied's Barrett Division Marketing Research.

He put gallonage of surface coatings used last year at 600 million (dollar value: $1.5 billion), set the poundage of components used (except thinners) at about 6 billion lbs. Pigments and color made up approximately 2.1 billion lbs. of this, solvents constituted another 2 billion lbs. Thinners added by consumers before they applied the coatings were thought to total about 0.5 billion lbs.

In order of importance, these thinners were: petroleum solvents, toluene, xylene, solvent naphtha, various ketones, alcohols, acetates, acetone and turpentine.

Quantity of resins used for surface coating was about 830 million lbs. in '57, with phthalic and nonphthalic resins making up half of this volume.

Looking ahead, Sayre spoke of the possibility of applying painted patterns to automotive interiors by roller-coating or lithographic techniques. He said that isocyanate-modified resins for high-impact coatings show signs of moving out of the lab, and predicted development of new alkyds with improved adhesion, durability and gloss.

Blueprinting Cosmetics: Along with prognostications on the future of their own industry, the soapers were given some hints of future developments in the cosmetics industry. Harry Kreider, of Chesebrough-Pond's, guardedly discussed a couple of future developments—a new way of applying color to the lips, and the possibility of new types of liquid leg make-up.

Most soapers left their convention well pleased; last year was a good one for them, and this year should be good, too.

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Business Built on a Blunder

By rediscovering the "wrong" epoxy-resin formula, Sam Reese founded a new chemical specialty company—Samrand, Inc. (Odessa, Tex.).

It's this accidentally discovered formulation, says Reese, that makes his modified epoxy-resin, Samrand, so different from other epoxy resins on the market today. Although these resins are noted for their adhesive properties, Samrand is said to be the only one-coat epoxy product that requires little or no surface cleaning.

The Right Mistake: According to Reese, his company got its start when he made a mistake mixing a batch of plastic coating for oil pipelines. Realizing that the improper mixture wouldn't work, he quickly got rid of it—or most of it. He left unnoticed a blob that had spilled on the concrete floor of his garage. Several months later, Reese tried to scrape it off, but even after scraping and prying with a putty knife, the blob still stuck to the cement surface.

The super-bonding quality of the plastic encouraged Reese to recall the wrong things he had done preparing the resin mixture. He tested all sorts of "wrong" ingredients to achieve the same mistake. Last April, Reese finally perfected the right "wrong" formula, applied for a patent and began marketing Samrand protective coating.

Starting at the Top: Now, Samrand is getting its biggest sales push as a protective coating for gravel-topped roofs. States Reese, "Where high winds are common, as in West Texas, it's difficult to hold the mineral aggregate on the roof. But simply by air-drying the roof surface and applying one coat of Samrand, the problem is eliminated."

Although Reese originally developed his epoxy-resin for coating gravel-topped roofs, he's also marketing it as a protective coating for metal (bronze, copper, brass) surfaces—claims it combats corrosion, electrolytic action, and abrasion, and withstands temperatures up to 400 F. Samrand is also being sold as a coating for asphalt tile and linoleum floors, and as a traffic paint. The coating, which can be applied by spray, brush or dipping, sets in two hours.

Small Plant, Big Problems: Like all young firms, Samrand's problems are numerous. Getting enough capital to advertise its product and increase the working force is its biggest worry. In order to supplement Reese's own funds, stock was sold to both his own and his wife's parents, and to two others.

Sam Reese does the selling, supervises the application and formulates the plastics. His wife is the bookkeeper and secretary. Contractors, wholesalers, manufacturers and sales representatives, make up the company's present distribution system.

Although most of Samrand's business is in Odessa, where customers pass along to neighbors the story of their refinished floor, roof or patio, outside orders are beginning to come in. Advertising is limited to the local newspaper, TV station and to a few direct-mail pieces. But recently, the City of New York ordered 125 gal. for marking streets.

The Reese product, available in 15 colors, is packaged in quarts, 1- and 5-gal. containers and in 55-gal. drums. Cost: $10 to $15.60/gal. in 55-gal. drums (depending upon the color). When sprayed, a gallon covers about 300 sq. ft. of smooth surface.

Although the company's sales volume is still small, Reese is optimistic. He predicts that, "If Samrand gets all the contracts now in the offing, sales volume should hit $1 million in '58."

Stretch for Strength

Specialty packagers are getting their first chance, this week, to study a new kind of kraft paper called Clupak. The new paper is stretchable, is claimed to do a better job of supporting weight and resisting impact (as the photo shows) than does conventional kraft.

Clupak is up to five times stronger than ordinary kraft, says maker West Virginia Pulp & Paper Co. The firm suggests the new paper primarily for multiwall sacks, for chemicals and similar products, and for single-wall grocery bags. But there appear to be numerous other applications: disposable clothing (e.g., house slippers, coveralls, brassieres), disposable undersheeting for hospital beds, paper-metallic laminates for the building industry and disposable saddle blankets for race horses.

Tile Adhesive Fight

The fight over an attempt to ban use of mastic tile adhesives for certain tile-laying applications in the San Francisco Bay area is nearing a climax. A court decision, expected in 60-90 days (California district court of appeals), may end the battle between the Peninsula Tile Contractor Assn. and two mastic manufacturers, Miracle Adhesives Corp. (New York) and Minnesota Mining & Mfg. Co.

The case: a clause in the Peninsula labor group's contract prevents its members from installing tile in areas exposed to water unless it has mortar backing. The clause also states that members of the union (Tile Layer's No. 19) can't work for a contractor who uses mastic tile installation.

Miracle and 3M sought and obtained an injunction preventing enforcement of both provisions. They claimed that the first provision had no objective (they presented evidence showing that mastic backing, when properly installed, stood up, even in water-exposure areas) and that the second provision was in violation of the Cartwright Act, California's equivalent of the Sherman Act.

Both adhesive companies said the Peninsula contractors decided to abandon mastics, due to failures caused by improper installation, and

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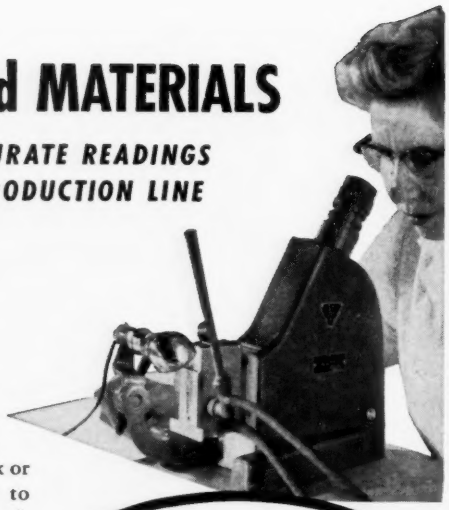

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SPECIALTIES

wanted to prevent competition from other contractors who offered low-cost mastic installations.

About a year and a half ago, the controversial mastic provision stirred up a lot of interest when the Peninsula group tried to force its clause on the Tile Contractors Assn. of Northern California. The Northern tile-layers refused to accept the mastic provision, said it violated the Cartwright Act.

Later, the district court of appeals upheld the injunction; and last month, Local 19 suffered a final defeat when its plea for a hearing was denied by the state supreme court. Northern California contractors argue that Local 19 fears its work load will be reduced because mastic installation is faster than the mortar installation. But they contend: "Work loads will increase. Mastic installation, being half as costly, will create more demand."

PRODUCTS

Quickee Film Dryer: Devel-O-Pill Corp. (Hollywood, Calif.) has developed a liquid film dryer that's said to reduce drying time for negatives. The material, called Instant Film Dryer, sells for $3.95/qt. bottle. Film is immersed in the dryer for two minutes, squeegeed on both sides. It is said to air-dry in a few seconds.

•

Dirt-Chaser Duo: Du Pont has developed a synthetic household sponge, called Combo, constructed of a layer of plastic foam joined to a layer of cellulose sponge by a water-resistant adhesive. The sponge has a dual function: the plastic side scours and scrubs, the cellulose side absorbs and wipes. It will sell for around 29¢ retail.

•

Dry Aerosol Scents: Van Ameringen-Haebler, Inc. (New York), has just introduced a series of aerosol fragrances containing no alcohol and soluble in fluorinated hydrocarbon propellents. They may be used in making dry aerosol sachets, are said to be compatible with benzoin, oak moss, tolu, tonka, mace, myrrh, styrax and fir balsam.

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Glycerine Alcohols: Dow has just started volume production of a new family of polyglycols known as the "11" series. According to Dow, its five trihydroxy polypropylene glycols,

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based on glycerine, will find use as nitro cellulose plasticizers and ingredients in hair-oil formulations. A special grade is being developed for use in urethane polymers.

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All-Weather Lacquer: Durez Plastics Division, Hooker Electrochemical Co., is now marketing a weather-resistant lacquer for coating glass-reinforced polyester panels. The transparent coating, tagged Hetrolax 105, is said to dry in 5-10 minutes and to retain its weather-resistant qualities over a temperature range of —13 F to 176 F. Cost: 75¢/lb. in 55-gal. drums.

•

Fire Stoppers: Two new chemicals for fighting metallic fires are now available—one from the U.S. Navy, the other from Mercantile Metals, Inc. (Carnegie, Pa.). The Navy's liquid extinguisher (trimethoxyboroxine) is particularly effective in quenching fires of magnesium alloys. Mercantile Metals' new product, X-8, is a granular material containing no borates or other fusible salts. X-8 can be shoveled or poured directly on burning metals. It's suggested for stopping zirconium fires.

•

Paper Shampoo: A new high-wet-strength paper coated with a synthetic detergent is County Laboratories Ltd.'s (Pall-Mall, London) latest shampoo development. According to the recently awarded patent, the paper does not disintegrate when used.

•

Keeps Metals Shiny: Marblette Corp. (New York) has added to its Maraset epoxy line a new varnish for protecting metals and other materials (plastic tools) from severe heat and corrosion. After a heat cure of 20 minutes, the coating is said to "resist abrasion and chipping and to maintain chemical resistance at temperatures from —60 C to 200 C."

•

Steroid Entry: Lederle Laboratories Division of American Cyanamid is making its first entry into the U.S.'s $83-million/year steroid market with aristocort triamcinolone, a synthetic steroid similar to substances secreted by adrenal glands. The new steroid is being marketed in 2- and 4-milligram tablets. Lederle says its product, tested on some 1,000 patients, is useful in treating arthritis, asthma and certain skin diseases.

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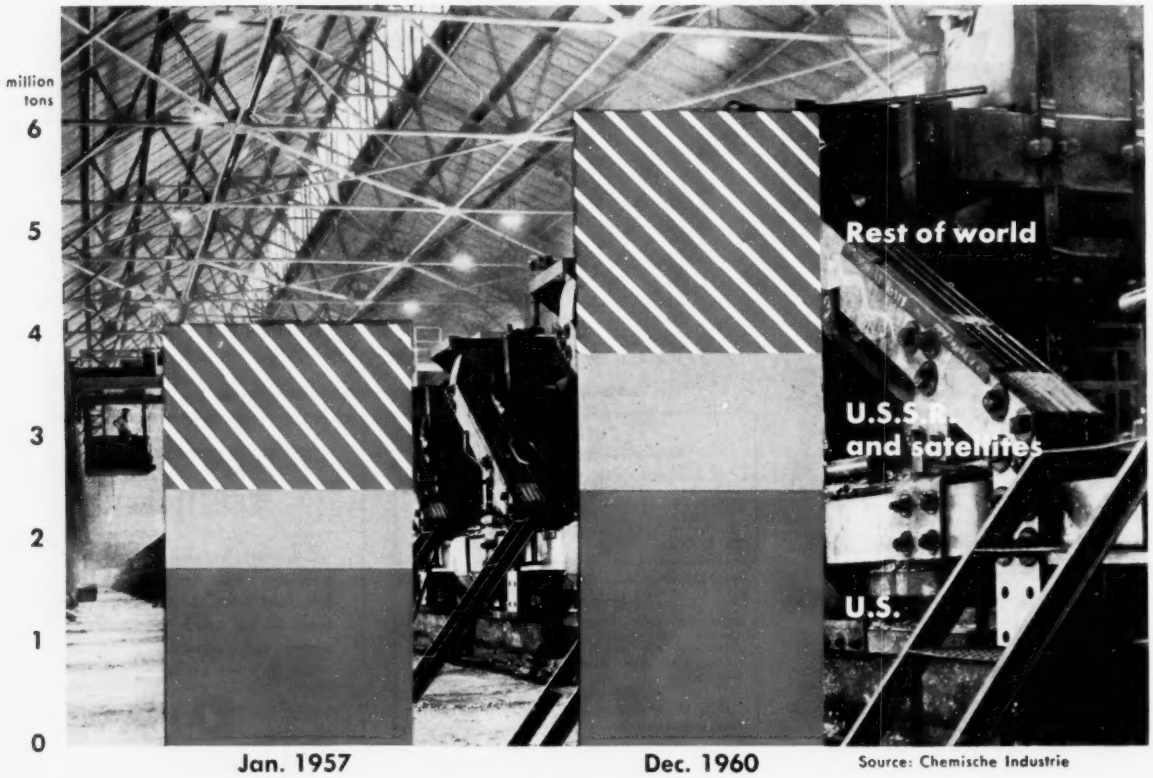

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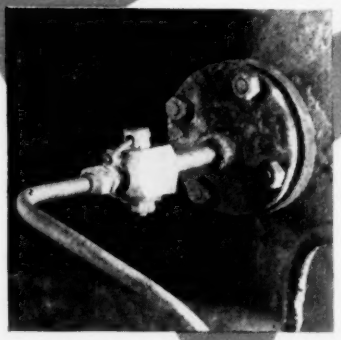
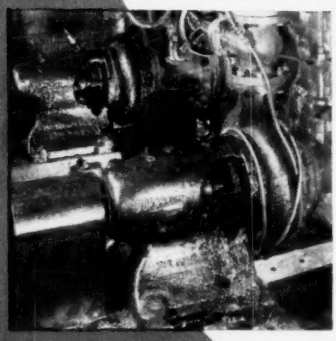


One of the first Durco Type F valves ever built. This valve has been in continuous service since December 31, 1949, handling 5% sulfuric acid saturated with ammonium sulfate.

Durco Type J202 Durimet 20 Y valve in service on inlet of 20,000 gals. 66° Baume H_2SO_4 storage tank. This valve replaced a 316 stainless steel gate valve.



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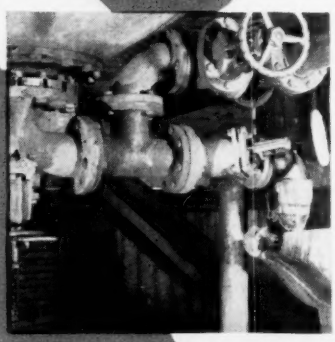

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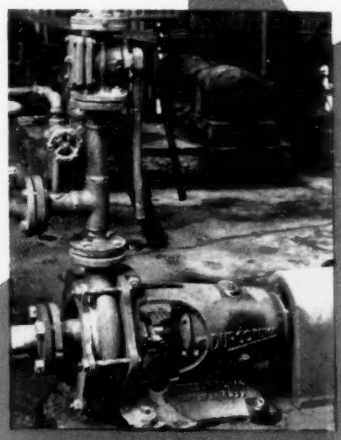

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